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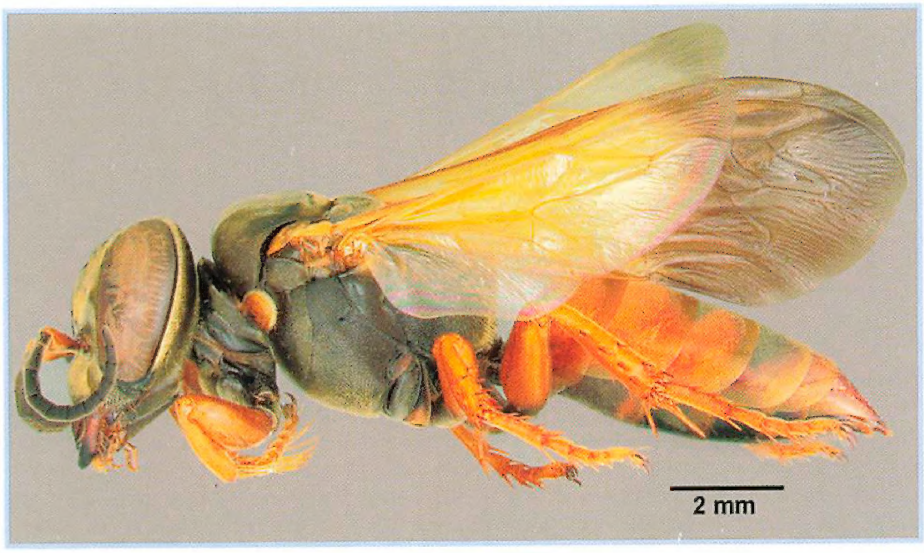

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The Wasp Genus *Tachysphex* Kohl, 1883, of Sahara, Sub-Saharan Africa, the Arabian Peninsula, and Madagascar (Hymenoptera: Apoidea: Crabronidae)[1]

Wojciech J. Pulawski
California Academy of Sciences, 875 Howard Street, San Francisco, California 94103, USA;
Email: wpulawski@calacademy.org

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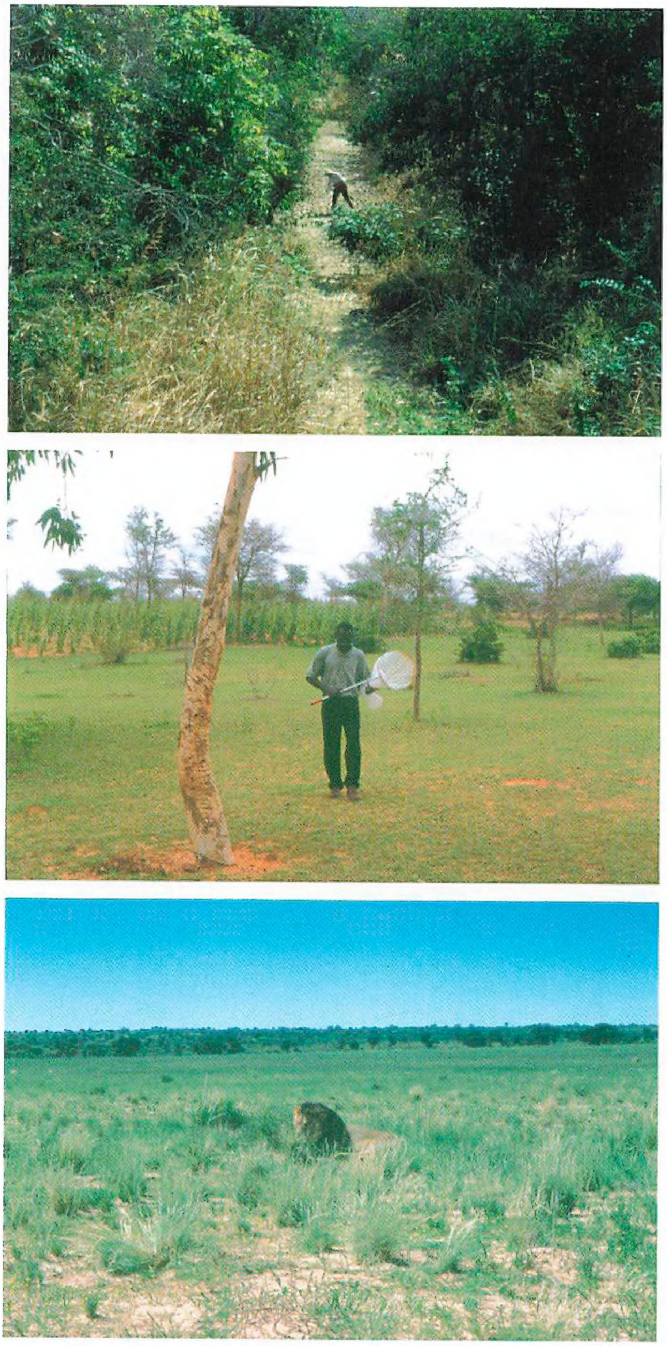


A. The author collecting *Tachysphex onager* at the type locality, 62 road km SW of Morogoro, Tanzania.
B. Monsieur Madougou Garba, a travel companion in Niger and a talented wasp collector.
C. A good collecting site in Kalahari Gemsbok National Park, South Africa.

ABSTRACT

Saharan, sub-Saharan, Arabian, and Malagasy species of *Tachysphex* Kohl, 1883, are revised, and 203 species are recognized. The revision includes a diagnosis of the genus, differential diagnoses and descriptions of all species, illustrations, geographic records, distribution maps, and keys to species identification. Previously unnoticed characters are used in keys, diagnoses, and species descriptions. A cladistic analysis is based on most of the world species.

The following 64 species are newly described: *aburi* (Ghana, Ivory Coast), *ampijoroa* (Madagascar), *asmara* (Eritrea, Ethiopia), *aureorufoniger* (Tanzania, Zambia), *bara* (Madagascar), *bemba* (Namibia, Zambia, Zimbabwe), *bostryx* (Ethiopia, Kenya, Somalia, Tanzania), *brachypus* (Zambia to northeastern South Africa), *calidus* (West Africa to South Africa), *camptopygus* (Namibia), *carinatus* (Tanzania, Zimbabwe), *cavatus* (Madagascar), *coxalis* (Mali), *curvipes* (Israel, Sinai Peninsula, Turkmenistan), *dissimulatus* (Botswana, Namibia, South Africa, Zimbabwe), *erectus* (Namaqualand region of South Africa), *erythrurus* (Kenya, Tanzania), *eurystoma* (eastern South Africa), *excavatus* (Mauritania to Niger and Togo), *frigidus* (southwestern Namib Desert), *gastrotrichus* (Namib Desert), *gessianus* (southern South Africa), *hadronyx* (Namib Desert, western South Africa), *iaphetes* (Kenya), *ibi* (South Africa), *karoo* (Little Karoo region of South Africa), *khoikhoi* (Namaqualand region of South Africa), *longipes* (Namib Desert), *melanius* (Angola, Botswana, Lesotho, Namibia, South Africa, Zimbabwe), *merina* (Madagascar), *mesembrius* (Eastern Cape Province of South Africa), *mkomazi* (Kenya, Tanzania), *mzingeli* (Botswana, Mozambique, Namibia, South Africa, Tanzania, Zimbabwe), *namaqua* (Namaqualand region of South Africa), *onager* (Malawi, Tanzania), *ovambo* (Angola), *paulus* (Namibia, South Africa), *platystethus* (Madagascar), *pseudofasciatus* (Algeria, Egypt, Israel, Tunisia), *psilonotus* (Eastern and Western Cape Provinces of South Africa), *punctiger* (western Namibia, western South Africa), *rapax* (Kenya, Tanzania), *rhacodes* (Ethiopia to Zimbabwe, Namibia), *rotundus* (Angola and Zaire to South Africa), *ruber* (Botswana, Namibia, northwestern South Africa), *rugosipleuris* (Cameroon to Senegal), *sabulosus* (northeastern South Africa, Zimbabwe), *sahelensis* (Mali, Senegal), *samburu* (Kenya, Tanzania), *scaber* (Botswana, Namibia, northeastern South Africa, Zambia, Zimbabwe), *scopa* (Angola, Namibia, western South Africa), *silvestris* (Ivory Coast to Tanzania), *socotrae* (Island of Socotra), *spectrum* (Kenya, Tanzania), *taita* (Namibia, Kenya, Tanzania), *tanqua* (South Africa), *tembe* (eastern South Africa), *thysanomerus* (Namibia), *tryssus* (northeastern South Africa, Zimbabwe), *ulonyovu* (Zimbabwe, eastern South Africa), *ulothrix* (Namibia), *usakos* (Namibia), *zambius* (Malawi, Zambia), and *ziziphi* (Namibia, western South Africa).

The following 13 taxa originally described as varieties or as subspecies are raised to full species status: *Tachysphex hermia* var. *angustus* Arnold, 1924; *panzeri* var. *caliban* Arnold, 1923; *diabolicus* var. *claripes* Arnold, 1924; *ambiguus* var. *congoensis* Arnold, 1924; *schoenlandi* var. *detritus* Arnold, 1924; *fluctuatus* var. *flavofimbriatus* Arnold, 1945; *oberon* var. *halophilus* Arnold, 1940; *schoenlandi* var. *luctuosus* Arnold, 1924; *sericeus* var. *kalaharicus* Arnold, 1924; *oberon* var. *mashona* Arnold, 1929; *georgii montivagus* Arnold, 1944; *braunsi* var. *rufopictus* Arnold, 1929; and *panzeri* var. *sycorax* Arnold, 1923.

The following are new synonyms (the valid name is listed last): *arenarius* Arnold, 1947 = *lacertosus* Arnold, 1944; *brachycerus* Arnold, 1940 = *rufopictus* Arnold, 1929; *braunsi* var. *boer* Arnold, 1929 = *barkeri* Arnold, 1923; *breijeri* (Arnold, 1922), originally described in *Schistosphex*, and *marshalli* var. *terrificus* Arnold, 1935 = *Tachysphex marshalli* R. Turner, 1917; *consanguineus* Arnold, 1924 = *brinckerae* R. Turner, 1917; *crassicornis* Arnold, 1945 = *insulsus* Arnold, 1945; *depilosellus* R. Turner, 1917,

and *depilosellus* var. *fallax* Arnold, 1924 = *quadricolor* (Gerstaecker, 1858); *diabolicus* var. *analis* Arnold, 1924 = *diabolicus* Arnold, 1923; *diabolicus* var. *trifasciatus* Arnold, 1924 = *claripes* Arnold, 1924; *dicksoni* Arnold, 1962, and *punctiventris* Arnold, 1924 = *modestus* Arnold, 1924; *gracilicornis baal* Pulawski, 1971 = *gracilicornis* Mercet, 1909; *halophilus* Arnold, 1940 = *mashona* Arnold, 1929; *incertus nattereri* Kohl, 1888, *incertus rufiventralis* Ferton, 1905, and *incertus kallipygus* Pulawski, 1971 = *incertus* (Radoszkowski, 1877); *julliani africanus* Pulawski, 1971 = *julliani* Kohl, 1883; *julliani nigripes* Tsuneki, 1972 (junior primary homonym of *nigripes* Pulawski, 1962) = *desertorum* F. Morawitz, 1894; *laticeps* Arnold, 1924, *costae canariensis* de Beaumont, 1968, and *costae fertoni* Pulawski, 1971 = *costae* De Stefani Perez, 1882; *halictiformis* Arnold, 1945 = *saturnus* Arnold, 1924; *liriformis tenax* Pulawski, 1971 = *aemulus* Kohl, 1906; *maidli* de Beaumont, 1940 = *detritus* Arnold, 1924; *minutus* Nurse, 1909, *miscophoides* (Arnold, 1923, originally described in *Atelosphex*), *fulvicornis* R. Turner, 1918, *heterochromus* de Beaumont, 1955, *sinaiticus* Pulawski, 1964, and *convexus* Pulawski, 1971 = *brevipennis* Mercet, 1909; *micromegas* de Saussure, 1892 = *fugax* (Radoszkowski, 1877); *nubilipennis* de Beaumont, 1950 = *albocinctus* (Lucas, 1849); *octodentatus* var. *inermis* Arnold, 1924, and *tridentatus* Arnold, 1924 = *octodentatus* Arnold, 1924; *panzeri* var. *nanus* Arnold, 1924, and *panzeri* var. *zavattarii* Guiglia, 1939 = *pentheri* Cameron, 1905; *scabrosus* Arnold, 1929 = *kalaharicus* Arnold, 1924; *subeditus* Leclercq, 1961 = *subcoriaceus* Arnold, 1945; *subfuscatus* R. Turner, 1917 = *prosopigastroides* Bischoff, 1913; *titania* var. *willowmorensis* Arnold, 1924 = *titania* Arnold, 1923; *tuckeri* Arnold, 1923 = *capensis* (de Saussure, 1867); *unguiculatus* Arnold, 1924, and *verhoeffi* Pulawski, 1971 = *harpax* Arnold, 1923; *villosus* Arnold, 1947 = *flavofimbriatus* Arnold, 1945. *Tachysphex selectus* Nurse, 1909, synonymized with *sericeus* F. Smith, 1856 by R. Turner, 1917, and subsequently regarded as valid species, is placed in synonymy of the latter again. Lectotypes have been designated for 59 nominotypical species.

INTRODUCTION

GENERAL.— *Tachysphex* has been the object of my studies for many years. I have revised the Palearctic, Neotropical, Australian, and Nearctic species (Pulawski 1971, 1974a, 1976, 1988), and also treated Sri Lankan and several other Oriental species (in Krombein and Pulawski 1994). This revision focuses on Africa, an area of exceptional species richness (almost 50% of the world species occur there). The Indian subcontinent and southeast Asia are still largely unstudied.

STUDY AREA.— The revision encompasses the entire continent of Africa except its narrow Mediterranean climatic zone, and also the Arabian Peninsula, Madagascar, and Comoro Islands. The following 11 species found in North Africa are excluded: *adjunctus* Kohl, *carli* de Beaumont, *denisi* de Beaumont, *latifrons* Kohl, *melas eatoni* Saunders, *obscuripennis* (Schenck), *persa* Gussakovskij, *pompiliformis* (Panzer), *pseudopanzeri* de Beaumont, *sericans gracilis* Pulawski, and *unicolor* (Panzer). They are Asian and/or European species that extend into Africa only marginally. All were revised by Pulawski (1971).

With four exceptions (*fulvitarsis*, *incertus*, *panzeri*, *tarsinus*), all bibliographic references and available locality records are provided for the species whose ranges extend beyond the study area.

TAXONOMIC HISTORY.— The first African *Tachysphex* were described from Egypt (Spinola 1839; Dahlbom 1845) and Algeria (Lepeletier de Saint Fargeau 1845; Lucas 1849; Dufour 1853), whereas the first sub-Saharan species came from South Africa (Cape Province and Durban: F. Smith 1856; de Saussure 1867), Gambia (F. Smith 1856), Mozambique (Gerstaecker 1858), and Ethiopia (Taschenberg 1880). As *Tachysphex* was not recognized until later (Kohl 1883), these species were placed in *Tachytes*, its synonym *Lyrops*, or in *Larrada* (a junior synonym of *Larra*). Additional

species were described by Kohl (1888, 1892, 1898), Morice (1897), Cameron (1905), Mercet (1909), Morice *in* Saunders (1910), Bischoff (1913), and R. Turner (1917a). By 1920, the number of nominal species described or otherwise recorded from Africa amounted to 49, of which 21 were sub-Saharan (16 of these 49 names were later recognized as junior synonyms). Arnold (1923, 1924) produced a comprehensive revision of southern African species, describing a total of 48 new species and 20 new varieties (of which 10 are actually good species), and provided the first, and so far the only, key to species determination for that area. He recognized 18 new species and five new varieties in his subsequent papers (1929, 1935, 1940, 1944, 1947, 1951, 1959, 1960, 1962), and Guiglia (1943, 1950) described one new species and one new variety.

The study of Malagasy *Tachysphex* began with de Saussure (1867), who described two species. Arnold (1945) provided an important revision, recognizing 12 species (seven new), and added two in 1947. The three species described by Leclercq (1961, 1967) were the latest additions.

For North Africa, de Beaumont's (1947) innovative revision of the Egyptian species was particularly important. All North African species were subsequently treated by Pulawski (1971) in a revision of the Palearctic *Tachysphex*.

Current state of species level taxonomy.— Our knowledge of sub-Saharan *Tachysphex*, stagnant since Arnold's major publications, is grossly inadequate. First, more than 60 species are still undescribed. Second, Arnold's material came mainly from Zimbabwe and South Africa, but species occurring elsewhere were largely unknown to him. Third, he could not recognize 14 species described by his predecessors and merely listed their names (Arnold 1923). Fourth, six of his new species are junior synonyms of species described from Europe: his *egregius, lanatus, laticeps, lugubris, minutulus,* and *miscophoides.* Fifth, he did not update his key to include the species described subsequently to his 1923 and 1924 papers. Most importantly, he was not aware of many essential characters that were discovered later, and this led to errors such as establishing a new genus, *Schistosphex,* for a teratological female of *marshalli.* In his keys, he relied heavily on coloration, which is often variable. He described the same species under different names (e.g., *modestus, punctiventris,* and *dicksoni;* or *lugubris* and *miscophoides*), often giving different names to each sex of one species (e.g., *barkeri* and *boer, hippolyta* and *viarius, mashona* and *halophilus, rufopictus* and *brachycerus, octodentatus* and *tridentatus*), or attributing to one species (*argentifrons*) females of one species and males of another. Some of his varieties are good species (e.g., the five varieties of *panzeri*), whereas others are only individual variants (*analis, inermis, terrificus*). As a result, recognition is not possible except for a few most distinctive species (for example, such an experienced and careful sphecid worker as de Beaumont, 1967, grossly misidentified *argentifrons* and *barkeri* using Arnold's key).

Limitations of current study.— In spite of my efforts, this study is also far from completeness for the following reasons: Large parts of Africa remain unexplored. Specifically, no material or little material has been collected in Angola, Benin, Central African Republic, Chad, Congo, Djibouti, Eritrea, Gabon, Guinea, Mozambique, Nigeria, Sierra Leone, Somalia, Sudan, and Zaire. A number of undescribed species are likely to occur there, and the known ranges of many species certainly extend to these countries.

Even in well explored parts of the continent (e.g., South Africa, western Zimbabwe), new species continued to come to light during my fieldwork there. Their number may still be significant. Also, there are significant seasonal differences in the wasp fauna composition, but very few areas have been monitored year round.

Some species apparently do not build up large populations and are rarely collected. For example, *ambositrae, iaphetes,* and *merina* are known from a single female each, and *asmara* and *fulgidus* from a single pair each. No specimens of *fulgidus* have been collected after 1912, and only

seven specimens of *luctuosus* have been found since 1924, in spite of intense prospecting of their habitats during the last 25 or so years. Nine species are known from one sex only (*ambositrae*, *aureorufoniger*, *cavatus*, *erectus*, *iaphetes*, *merina*, *tembe*, *venator*, *zambius*). Certainly more such species occur in Africa.

Some apparently undescribed species, represented by unique specimens in the material studied, have been excluded because of the unknown amount of individual variation and because of the lack of the opposite sex.

A number of poorly differentiated specimens have also been omitted from this study, with only a few being discussed in the text. They may be either good species or individual variants of described species, but it was impossible for me to decide on their status. Such problem specimens, common in *Tachysphex*, were first noticed by de Beaumont (1940, 1947a) and prompted him to comment later that "le genre *Tachysphex* semble avoir été créé pour décourager les taxonomistes." Particularly frustrating are members of the *panzeri* group.

Apart from limited material and taxonomic difficulties, the following are major inadequacies:

1. Insufficient knowledge of behavior, particularly of the nesting habits and male behavior.
2. Insufficient knowledge of preimaginal stages. Larvae of *Tachysphex* are known only for the following five African species: *albocinctus*, *costae*, *nitidus*, *plicosus*, and *tarsinus*, and for the following five extralimital species: *apicalis* (W. Fox), Nearctic (Evans 1964), *obscuripennis* (Schenck), Palearctic (Grandi 1961), *pompiliformis* (Panzer), Palearctic (Grandi 1928d, 1961), *terminatus* (F. Smith), Nearctic (Evans 1958), and *unicolor* (Panzer), Palearctic (Grandi 1928a, 1961, as *nitidus*).
3. Insufficiently resolved cladogram (see below).

Lectotype selections.— For the species described in 1923 and 1924, Arnold designated a female and a male as types when both sexes were available, even when he mentioned only one type specimen in the original description (usually without reference to its gender). This practice is in violation of Article 73.1 of the Code. In all such cases, I designated one of the specimens as the lectotype, and the other as paralectotype.

Technical terms and symbols.— As usual, I follow Bohart and Menke (1976) in their usage of morphological terms, but less known terms taken from other sources are redefined here for convenience. Mandibular terms are based on Michener and Fraser (1978) with modifications by Pulawski (1995).

Clypeus (Fig. 1): has a middle section and two lateral sections. The middle section usually has a densely punctate, setose basomedian area, a sparsely punctate, shiny bevel, and a marginal lip. The prominent, medioventral portion of the middle section is often referred to as the lobe. The free margin of the lobe can be straight, arcuate, biarcuate, sinuate, or concave; the lip can have a mesal emargination and/or lateral incisions on each side. The clypeal length is measured along the body's longitudinal axis.

Disk: the central part of a sclerite, e.g., scutal disk, tergal disk.

Episcrobal area: the portion of the mesopleuron above the scrobal groove and below the

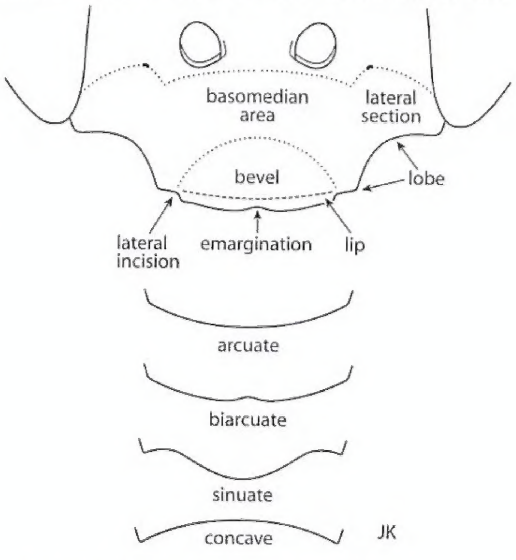


Figure 1. Terms for clypeus of *Tachysphex*.

subalar fossa (Budrys 1990, 1993). Bohart and Menke (1976) called it hypoepimeral area, a morphologically inaccurate term meaning "area under the epimeron".

Episternal sulcus complete (incomplete): reaching (not reaching) mesothoracic foremargin.

Frons: the area between the frontoclypeal suture and hindocellus.

Hindwing crossvein cu-a vertical: both ends equally distant from wing base.

Mandible:

— **acetabular groove**: a setiferous longitudinal groove on the outer mandibular surface, starting at some distance from the acetabulum;

— **acetabulum**: mandibular articulation adjacent to clypeus;

— **adductor ridge**: extends distad from the mandibular base on its inner side, adjacent to oral fossa and, in most sphecids, gradually becomes visible from the outer side, constituting the distal part of the mandibular posterior margin. This ridge is often differentiated into a lower basal portion and a higher distal portion; when so, the two portions meet at an angle, or slightly overlap, or are separated by a gap; in species with notched mandibles, the distal portion delimits the notch from its distal side;

— **basal width**: distance between acetabular and condylar ridges measured next to acetabulum and condyle;

— **condylar ridge**: arises from the condyle, extends distad, and forms the basal portion of the posterior mandibular margin; it is angulate distally in many Larrinae (including most *Tachysphex*);

— **condyle**: mandibular articulation on the occipital side of the head capsule;

— **notch**: an emargination on the posterior margin, delimited basally by the condylar ridge and distally by the expanded portion of the adductor ridge;

— **outer ridge**: a longitudinal convex area on the outer mandibular surface ventrad of acetabular groove; in *Tachysphex*, passing just dorsad of the notch;

— **trimmal carina**: corresponds to the cutting edge of the mandible, and can also be described as the inner mandibular edge. Michener and Frazer (1978) distinguished between the trimmal carina, the basal portion of the cutting edge, and the upper carina, the remaining portion of the edge. The term "upper carina", however, is morphologically correct only when the mandibles are closed. I find it more practical to call the trimmal carina both these sections, as I did previously (Pulawski, 1992; Krombein and Pulawski, 1994).

Mesothoracic venter: area between the fore- and midcoxae, limited laterally by the mesopleural signa.

Postocellar area (Fig. 2):

— **length**: the distance between a hindocellus and an imaginary line connecting the eye hindcorners (i.e., the points where the inner and the posterior portions of the orbits meet). In spite of the orbit curvature, the length can be measured with enough precision to allow comparison with width;

— **width**: the shortest interocular distance.

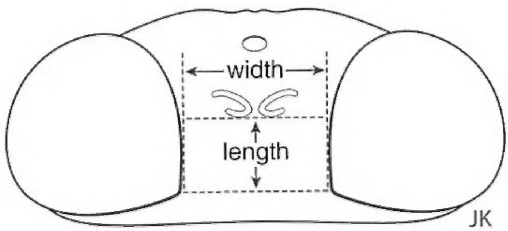


FIGURE 2. Terms for postocellar area of *Tachysphex*.

Scutal flange (Menke, 1988): the reflexed upward, impunctate and glabrous portion of the scutal lateral margin, extending between the tegula foremargin and the scutellar foremargin. Called supra-alar carina by Melo (1999).

Scutum: shortened term for mesothoracic scutum.

Simple: without any specialized structure, e.g., frons simple (without supraantennal swelling).

Sternum, tergum: abbreviated terms for gastral sternum, gastral tergum.

Sources of Material.— This paper is based on a study of 24,908.specimens. I collected many in Burkina Faso (2004), Cameroon (2003), Egypt (1957–58, 1993), Ethiopia (1997), Ghana (1991), India (1989), Ivory Coast (1991), Kenya (1999, 2000, 2002), Madagascar (1994), Mali (1991), Mauritania (1993), Namibia (1990, twice in 1996), Niger (2005), Oman (2003), Pakistan (1989), Senegal (1991), South Africa (1990, 1996, 2001), Tanzania (2001, 2003), Thailand (1988, 1989), Togo (1991), Turkmenistan (1964), Zambia (1995, 1998), and Zimbabwe (1995, twice in 1996, 1997, 1998); and many more were sent by institutions and individuals. Specimens for which a depository is not indicated in the Records sections under individual species are at the California Academy of Sciences (CAS). The following is a list of institutional and personal collections where the material is housed (the capitalized abbreviations preceding the names are used in the text to designate these collections; the name of the contact person is omitted, if no material was borrowed for this study):

A. Alfieri collection, Cairo, Egypt, now in care of the Entomological Society of Egypt, Cairo, Egypt.
A. Mochi collection (originally in Cairo, in care of A. Alfieri during World War II and thereafter, largely combined with his own collection; many types subsequently transferred by him to USNM; small part returned to Alessandro Mochi, Rome, Italy, now deposited at Museo Regionale di Scienze Naturali, Torino, Italy).
AAU: Addis Ababa University, Addis Ababa, Ethiopia.
AEI: American Entomological Institute, Gainesville, Florida (David B. Wahl).
AMG: Albany Museum, Grahamstown, South Africa (Friedrich W. Gess).
AMNH: American Museum of Natural History, New York, New York (James M. Carpenter, Jerome G. Rozen, Jr., Eric L. Quainter).
ANSP: The Academy of Natural Sciences, Philadelphia, Pennsylvania (Donald Azuma).
BALDOCK: David W. Baldock, Milford, Surrey, United Kingdom (personal collection).
BMNH: The Natural History Museum, London, formerly British Museum (Natural History), United Kingdom (Laraine Ficken, David G. Notton, Christine Taylor, George Else).
CNC: Canadian National Collection of Insects, Arachnids, and Nematodes, Biosystematic Research Institute, Ottawa, Ontario (John Huber).
CSE: Christian Schmid-Egger, Herrsching-Breitbrunn, Germany (personal collection).
CU: Cornell University, Department of Entomology, Ithaca, New York (E. Richard Hoebeke).
DURBAN: Durban Natural Science Museum, Durban, South Africa (Tanza Clark).
FB: Franco Borgato, Bruxelles, Belgium (personal collection).
FSAG: Faculté Universitaire des Sciences Agronomiques, Gembloux, Belgium (Camille Thirion, Alain Pauly).
FSCA: Florida State Collection of Arthropods, Gainesville, Florida (James R. Wiley).
GENOVA: Museo Civico di Storia Naturale "Giacomo Doria", Genova, Italy (Valter Raineri).
HALLE: Institut für Zoologie, Martin-Luther Universität, Halle-Wittenberg, Germany (M. Dorn).
JG: Josef Gusenleitner, Linz, Austria (personal collection).
JS: Jakub Straka, Praha, Czech Republic (personal collection).
KMG: Kenneth M. Guichard, London, United Kindgom (personal collection, recently transferred to BMNH).
KRAKÓW: Instytut Systematyki i Ewolucji Zwierząt, Polska Akademia Nauk, Kraków, Poland.
KU: Snow Entomological Museum, The University of Kansas, Lawrence, Kansas (Robert W. Brooks).
LACM: Natural History Museum of Los Angeles County, Los Angeles, California, USA (Brian V. Brown, Roy R. Snelling).
LAUSANNE: Musée Cantonal de Zoologie, Lausanne, Switzerland (Michel Sartori, Anne Freitag).
LB: Leo Blommers, Rhenen, The Netherlands (personal collection).
LEM: Lyman Entomological Museum and Research Laboratory, Mac Donald College, McGill University, Ste. Anne de Bellevue, Quebec, Canada (P. Michael Sanborne, Cha-Chi Hsiung).
MCZ: Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts (Gabriela Chavarria).
MHNB: Musée d'Histoire Naturelle de Bâle, Bâle (= Basel), Switzerland (Michel Brancucci).
MHNCF: Musée d'Histoire Naturelle de la Ville de Clermont-Ferrand, France (Frédéric Durand).

MHNG: Musée d'Histoire Naturelle de Genève, Switzerland (Ivan Löbl).
MILANO: Museo Civico di Storia Naturale, Milano, Italy (Carlo Pesarini).
MNCN: Museo Nacional de Ciencias Naturales, Madrid, Spain.
MNHN: Museum National d'Histoire Naturelle, Paris, France (Janine Casevitz-Weulersse, Claire Villemant).
MRAC: Musée Royal de l'Afrique Centrale, Tervuren, Belgium (Eliane De Coninck, Alain Pauly).
MS: Maximilian Schwarz, Ansfelden bei Linz, Austria (personal collection).
MSNT: Museo Regionale di Science Naturali, Torino, Italy (Mauro Daccordi, Guido Pagliano).
MTM: Magyar Természettudományi Múzeum, Budapest, Hungary (Jenö Papp).
NAPOLI: Istituto e Museo di Zoologia dell'Università di Napoli, Napoli, Italy.
NMK: National Museums of Kenya, Nairobi, Kenya.
NHMO: Natural History Museum of Oman, Muscat, Oman.
NHMW: Naturhistorisches Museum, Wien, Austria (the late Stefan Schödl).
NHMZ: Natural History Museum of Zimbabwe, Bulawayo, Zimbabwe.
NMN: The National Museum of Namibia, Windhoek, Namibia (Eugene Marais).
NRS: Naturhistoriska Riksmuseet, Stockholm, Sweden (Fredrik Ronquist).
OHL: Michael Ohl, Berlin, Germany (personal collection).
OÖLM: Oberösterreiches Landesmuseum, Linz, Austria (Fritz Gusenleitner, Maximilian Schwarz).
OXUM: Oxford University Museum of Natural History, Oxford, United Kingdom (Christopher O'Toole).
PMA: Provincial Museum of Alberta, Edmonton, Alberta, Canada (Albert T. Finnamore).
PPRI: Plant Protection Research Institute, Pretoria, South Africa (Connal D. Eardley).
RMNH: Nationaal Naturhistorisch Museum (formerly Rijksmuseum van Natuurlijke Historie), Leiden, the Netherlands, including P.M.F. Verhoeff collection (Kees van Achterberg).
RTST: T. Terko Simon Thomas, Nunspeet, The Netherlands (personal collection).
SAM: South African Museum, Iziko Museums of Cape Town, Cape Town, South Africa, including G. Arnold collection previously housed in the then National Museum of Southern Rhodesia, Bulawayo, Zimbabwe (Margie A. Cochrane).
SCHL: Wolfgang Schlaeffle, Kaiseraugst, Switzerland (personal collection).
SDNHM: Natural History Museum, San Diego, California (David K. Faulkner).
STUTTGART: Staatliches Museum für Naturkunde in Stuttgart, Stuttgart, Germany (Till Osten via Michael Ohl and C. Schmid-Egger).
TMB: Termeszéttudományi Múzeum, Budapest, Hungary (Dr. Jenö Papp).
TMP: Northern Flagship Institution Natural History Museum (formerly Transvaal Museum), Pretoria, South Africa (Paul S. Bayliss, Annette Bennett, Barbara Dombrowsky, Iléma Fourie, Suzanne Prinsloo, Robert B. Toms).
UCD: Bohart Museum of Entomology, University of California, Davis, California, USA (Richard M. Bohart, Steve L. Heydon).
UDS: University of Dar es Salaam, Dar es Salaam, Tanzania.
USNM: National Museum of Natural History (formerly United States National Museum), Smithsonian Institution, Washington, D.C. (Arnold S. Menke, Maureen Mello).
UST: Università degli Studi di Torino, Dipartamento di Entomologia e Zoologia Applicate all'Ambiente Carlo Vidano, Torino, Italy (G. Pagliano).
USU: Bee Biology and Systematics Laboratory, Utah State University, Logan, Utah (Terry L. Griswold, Frank D. Parker).
ZIN: Zoological Institute, Russian Academy of Sciences, St. Petersburg, Russia.
ZMAN: Zoölogisch Museum, Universiteit van Amsterdam, Amsterdam, the Netherlands (Willem Hogenes).
ZMHU: Zoologisches Museum der Humboldt Universität, currently Museum für Naturkunde, Institut für Systematische Zoologie, Berlin, Germany (Frank Koch).
ZMMU: Zoological Museum, Moscow State University, Moscow, Russia.
ZMLU: Zoological Museum, Lund University, Lund, Sweden (Roy Danielsson).
ZMUC: Zoological Museum, Copenhagen, Denmark (the late Ole Lomholdt).
ZSBS: Zoologische Sammlung des Bayerischen Staates, Münich, Germany (Erich Diller).

Collectors Names.— For the sake of brevity, collector names in the type series of new species are abbreviated as follows (names mentioned only once or a few times are spelled in full):

AM: Alessandro Mochi
CDE: Connal D. Eardley
FSG: Friedrich W. Gess and Sarah K. Gess
MS: Maximilian Schwarz
WJP: Wojciech J. Pulawski

Specimen and locality records, former and current geographic names.— Except for some holotypes and lectotypes, only the specimens examined for this paper are listed under the relevant locality for each species (specimens studied previously but not reexamined are excluded). A reference to a publication after a locality name indicates that the record is taken from the literature.

All the locality names listed under Records have been checked against available maps and gazetteers and then used to produce the distribution maps. The country and locality names currently in use are often different from those given in the literature or on specimen labels, and I have tried to use only the current official names (with the exception of Zaire). A comparative list is given below for convenience:

Abercorn, Northern Rhodesia: now Mbala, Zambia.
Aiyina, Greece: also spelled Aegina or Egina.
Akmolinsk, Kazakhstan: now Astana.
Aktyubinsk, Kazakhstan: now Aktöbe.
Albert National Park, Belgian Congo: now Virunga National Park, Zaire.
Balkhash, Kazakhstan: now Balqash.
Basutoland: now Lesotho.
Belgian Congo: now Zaire, or Democratic Republic of Congo.
Boesmanland, Namibia: now Tsumkwe District.
Chimkent, Kazakhstan: now Shymkent.
Damaraland, Namibia: now Khorixas District.
Deesa, India: current alternative spelling is Disa.
Diégo-Suarez, Madagascar: now Antsiranana.
Dzhambul, Kazakhstan: now Zhambyl.
Dzhezkazgan, Kazakhstan: now Zhezqazghan.
Elisabethville, Belgian Congo: now Lubumbashi, Zaire.
Gold Coast: now Ghana.
Fort Dauphin, Madagascar: now Tolanaro.
Fort Gouraud, Mauritania: now Fdérik.
Fort Jameson, Northern Rhodesia, now: Chipata, Zambia.
Fort Victoria, Southern Rhodesia: now Nyanda, Zimbabwe.
Foulpointe, Madagascar: now Mahavelona.
Gur'yev, Kazakhstan: now Atyraū.
Irghiz, Kazakhstan: now Yrghyz.
Harar, Ethiopia: currently spelled Harer.
Hester Malan Nature Reserve, South Africa: now Goegap Nature Reserve.
Kaokolandgebied 1, Namibia: now Opuwo District.
Karaganda, Kazakhstan: now Qaraghandy.
Katamia, Egypt: alternative spellings are Katana, Katania, or Qattania.
Katanga Province, Belgian Congo: now Shaba Province, Zaire.
Kavango Giebied 1, Namibia: now Rundu District.
Khami, Zimbabwe: now spelled Kami.
Kirovabad, Azerbaijan SSR: now Gäncä, Azerbaijan.

Kokchetav, Kazakhstan: now Kökshetaū.
Kustanai, Kazakhstan: now Qustanay.
La Calle, Algeria: now El Kala.
Léopoldville, Belgian Congo: now Kinshasa, Zaire.
Lourenço Marques, Mozambique: now Maputo.
Majunga, Madagascar: now Mahajanga.
Mangyshlak, Kazakhstan: now Mangghystaū.
Matopos, Southern Rhodesia: now Matobo, Zimbabwe.
Moçâmedes, Angola: now Namibe.
Nagele or Neghelli, Ethiopia: currently spelled Negele.
Northern Rhodesia: now Zambia.
Nyasaland: now Malawi.
Ohopoho, Namibia: now Opuwo.
Oloff Berghfontein, South Africa: also spelled Olaf Bergfontein or Oloff Bergh Fontein.
Owambo, Namibia: now divided between five regions, including the Oshana Region (with Oshakati and Ondangwa Districts).
Poona, India: now spelled Pune.
Port-Lyautey, Morocco: now Kenitra.
Punda Milia in Kruger National Park, South Africa: now Punda Maria.
Saint Augustin, Madagascar: now Anantsono.
Sainte Marie de Madagascar: now Nosy Boraha.
Salisbury, Southern Rhodesia: now Harare, Zimbabwe.
Semipalatinsk, Kazakhstan: now Semey.
Sinola, Zimbabwe: now Chinhoyi.
Southern Rhodesia: now Zimbabwe.
South West Africa: now Namibia.
Soutpan, or Saltpan: South Africa: now Tswaing
Stanleyville, Belgian Congo: now Kisangani, Zaire.
Tamatave, Madagascar: now Toamasina.
Tanqua-Karoo National Park, South Africa: also spelled Tankwa-Karoo.
Thysville, Belgian Congo: now Mbanza Ngunga, Zaire.
Transvaal, South Africa: now divided into Gauteng, Mpumalanga, and Northern provinces.
Tuléar, Madagascar: now Toliara.
Upper Volta or Haute Volta: now Burkina Faso.
Ural'sk, Kazakhstan: now Oral.
Ust'-Kamenogorsk, Kazakhstan: now Öskemen.
Usumbura, Urundi: now Bujumbura, Burundi.
Wankie, Zimbabwe: now Hwange.
Zaire: now Democratic Republic of Congo.

Latitude and longitude in locality records.— For brevity's sake, repetitive longitude and latitude data on the specimen labels are listed below, but not in the Record sections under individual species. The longitude and latitude are given as recorded on the locality labels, i.e., the fractions of the minutes are expressed either as seconds or as decimals (many collectors did not record fractions of minutes).

Botswana
Kuke Pan: 20°59′S 22°25′E
Moremi Reserve: 19°23′S, 23°33′E
Serowe, Farmers Brigade: 22°25′S 26°44′E

Burkina Faso
Gorom Gorom, 15 km SE: 14°21.4′N 0°07.9′W

Cameroon
Campement des Eléphants, 15 km W (67 km S Garoua): 8°46.6′N 13°36.5′E
Maroua, 40 km S: 10°14.8′N 14°12.6′E
Mokolo, ca 10 km W: 10°43.5′N 13°42.4′E

Ethiopia
Arba Minch, 42 road km NNE: 6°17′N 37°47′E
Arba Minch, 58 road km NNE: 6°24′N 37°45′E
Condaraba: 4°58′N 36°49′E
Jijiga, 44 km ENE: 9°29′N 43°10′E
Jijiga, 37 km SE: 9°11′N 43°05′E
Jijiga, 43 km SE: 9°09′N 43°08′E
Lake Chamo, W shore: 5°56′N 37°32′E
Langano: 7°35′N 38°42′E
Moyale: 3°33′N 39°03′E
Moyale, 13 km N: 3°38′N 38°59′E
Moyale, 16 km N: 3°39′N 38°57′E
Moyale, 22 km N: 3°40′N 38°55′E
Moyale, 26 km N: 3°41′N 38°53′E
Moyale, 35 km N: 3°43′N 38°50′E
Moyale, 100 km N: 4°01′N 38°22′E
Moyale, 120 km N: 4°09′N 38°16′E
Nazret, 8 km W: 8°25′N 39°20′E
Negele: 5°19′N 39°35′E
Sodo, 49 road km SE: 6°29′N 37°40′E
Yabelo, 4 km E: 4°53′N 38°08′E
Yabelo, 63 km S: 4°22′N 38°17′E
Yabelo, 76 km N: 5°28′N 39°16′E
Ziway: 7°56′N 38°43′E

Israel
Ashkelon, 8 km NNE: 31°45′N 34°37′E
Beersheba, 32 km SE (= 5 km E Yeroham): 30°58′N 34°58′E
Elat, 5 km W: 29°32′ N 34°54′E
Elat Iddan, 135 km N: 30°47′N 35°17′E
Elat Zuqim Resort on Dead Sea N Qumeran: 31°41′N 35°28′E
En Zeelim on Dead Sea 5 km N Masada: 31°23′N 35°20′E
En Zin in Arava Valley: 30°53′41″N 35°09′11″E
Har Badad in Arava Valley: 30°36.1′N 35°03.0′E
Hazeva in Arava Valley: 30°46.8′N 35°14.6′E
Hazeva Field School in Arava Valley: 30°46.77′N 35°14.58′E
Iddan in Arava Valley: 30°48.9′N 35°16.8′E
Mazad Aqrabbim 45 km SE Beersheba: 30°57′N 35°08′E
Moshaav Hazeva in Arava Valley: 30°46.3′N 35°16.3′E
Nakhal Zin at El Aqrabim: 30°53.4′N 35°09.4′E
Nasholim Beach 22 km S Haifa: 32°36′N 34°54′E
Sede Boker, 5 km SSE: 30°49′N 34°48′E
Shizaf Nature Reserve in Arava Valley: 30°45.18′N 35°15.50′E
Wadi En Aqrabbim 50 km SE Beersheba: 30°57′N 35°08′E
Wadi N'Aqev 5 km SSE Sede Boqer: 30°49′N 34°48′E
Wadi Qelet 5 km W Jericho: 31°50′N 35°23′E

Kenya
Archer's Gate to Samburu National Reserve: 0°37.7′N 37°38.3′E

Archer's Post at Ewaso Ng'iro River: 0°39′N 37°41′E
Archer's Post, 2 km S: 0°37.0′N 37°40.3′E
Diani Beaches: 4°21.0′S 39°33.8′E
Eliye Springs on W shore of Lake Turkana: 3°15.2′N 36°01.3′E
Ewaso Ng'iro River opposite Archer's Post: 0°38.1′N 37°40.4′E
Isiolo, 5 km NNE: 0°24.3′N 37°35.7′E
Kajiado, 5 km S: 1°52.6′S 36°46.7′E
Kakamega Forest Reserve: 0°20.7′N 34°52.0′E
Lodwar: 3°07′N 35°35′E
Lodwar, 33 km N: 3°20.7′N 35°27.8′E
Lodwar, 120 km S: 2°13.7′N 35°33.3′E
Lodwar road 4 km N road to Sigor: 1°33.7′N 35°27.7′E
Magadi road 25 air km SW Nairobi (= 21 km SW Kiserian): 1°31.3′S 36°06.4′E
Magadi road 46 air km SW Nairobi (= 43 km SW Kiserian): 1°34.0′S 36°27.4′E
Magadi road 51 air km SW Nairobi (= 48 km SW Kiserian): 1°34.6′S 36°24.5′E
Magadi road ca 53 air km SW Nairobi: 1°35.9′S 36°24. 2′E
Marich Pass Field Studies Centre: 1°32.2′N 35°27.4′E
Marich Pass area 4 km N road to Sigor: 1°33.7′N 35°27.7′E
Marich Pass area 24 km N road to Sigor: 1°42.2′N 35°29.5′E
Matembur in West Pokot District: 1°22′N 35°03′E
Mpala Research Station 48 km NW Nanyuki: 0°17.5′N 36°53.9′E
Mtito Andei, 32 km NW: 2°30.5′S 38°00.9′E
Muhaka: 4°20′S 39°30′E
Mwingi, 12 km SW: 0°58.8′S 37°59.5′E
Naivasha, 20 km NW: 0°34.2′S 36°21.6′E
Naivasha, 30 km NW: 0°29.0′S 36°18.0′E
Naivasha, 27 km SSE: 0°54.6′S 36°31.0′E
Naivasha, 29 km SSE: 0°55.7′S 36°31.0′E
Nakuru, 35 road km WNW: 0°13.2′S 35°44.6′E
Namanga, 4 km NNE: 2°31.4′S 36°49.8′E
Narok, 77 km E: 1°00.6′S 36°30.2′E
Naro Moru: 0°09′S 37°01′E
Olorgesailie: 1°34.5′S 36°26.6′E
Papenditi: 0°18.7′S 34°56.0′E
Shimba Hills: 4°12.3′S 39°25.2′E
Taita Discovery Centre: 3°42.3′S 38°46.6′E
Taita Discovery Centre, ca 10 km N: 3°35.8′S 38°45.8′E
Taita Discovery Centre: Galla Hill area: 3°43.3′S 38°44.2′E
Tiwi Beaches ca 17 km S Mombasa: 4°14.4′S 39°36.2.′E
Thika, 94 km E: 1°06.6′S 37°42.1′E
Thika, 118 km E: 1°02.3′S 37°51.5′E
Voi: 3°24.0′S 38°33.2′E
Voi, 2 km S: 3°24.7′S 38°32.3′E
Voi, about 1 km SE: 3°24.5′S 38°33.7′E
Voi, 14 km SW: 3°28.2′S 38°28.3′E
Voi, 16 km SW: 3°28.3′S 38°27.6′E

Madagascar

Ambatofitorahana 33 km S Ambositra: 20°46′S 47°11′E
Ambohimanga: 18°46′S 47°34′E
Amborovy 8 km NE Mahajanga: 15°40′S 46°20′E
Ampanihy, 22 km E: 24°41′S 44°46′E
Ampanihy, 3 km NW: 24°40′S 44°43′E

Berenty Reserve: 25°00′S 46°18′E
Betioky, 22 km N: 23°21′S 44°20′E
Beza Mahafaly: 23°42′S 44°42′E
Forêt d'Orangea 3.6 km SE Ramena: 12°15′32″S 49°22′29″E
Ifaty (N Toliara): 23°08′S 43°37′E
Ihosy, 84 km NE: 21°58′S 46°35′E
Ihosy, 40 road km W: 22°28′S 45°49′E
Isalo area: 22°42′S 45°13′E
Isalo National Park: 22°36′S 45°10′E
Isalo National Park: Piscine Naturelle: 22°34′S 45°22′E
Mahabo: 20°22′S 44°40′E
Mahavelona: 17°40′S 49°30′E
Mandraka: 18°56′S 47°56′E
Manjakatompa: 19°21′S 47°19′E
Ranohira, near: 22°34′S 45°24′E
Ranohira, 10 km E: 22°31′S 45°30′E
Ranomafana: 21°15′S 47°27′E
Ranomafana National Park: 21°16′S 47°25′E
Reserve Spéciale d'Ankarana 2.6 km E Andrafiabe: 12°55′S 49°03′E
Sakalava Beach, 1 km W: 12°15′59″S 49°23′42″E
Sakalava Beach, 3 km W: 12°17′1″S 49°22′00″E
Sakaraha, 38 km E: 22°46′S 44°51′E
Tapia, col de: 20°17′S 47°07′E
Toamasina: 18°07′S 49°24′E
Toamasina, 20 road km SW: 18°15′S 49°16′E
Tolanaro: 25°02′S 46°57′E
Toliara, 5 km N: 23°18′S 43°39′E
Toliara, 10 km NE: 23°18′S 43°45′E
Toliara, 12 km SE: 23°25′S 43°45′E
Tsiombe, 8 km W: 25°19′S 45°25′E
Tsiombe, 20 km W: 25°16′S 45°21′E
Vohiparara: 21°14′S 47°23′E

NAMIBIA
Aminuis: 23°43′S 19°21′E
Aris, 2 km S: 22°46′S 17°08′E
Arnhem Farm 110 km E Windhoek: 22°41′S 18°08′E
Aus, near on road to Helmeringhausen: 26°37′S 19°20′E
Bethanis: 20°24′S 14°24′E
Brandberg: Hungorob Ravine mouth: 21°13.36′S 14°31.00′E
Brandberg: Hungorob River: 21°13.05′S 14°31.01′E
Brandberg: Messum Valley: 21°13.29′S 14°30.98′E
Brandberg: Plateau Valley: 21°10′46″S 14°32′52″E
Brandberg: Wasserfallfläche: 21°10.42′S 14°32.55′E
Büllsport, SE 4 km from road C14 on D854: 24°11′S 16°24′E
Carlowa's Camp, Angra Fria: SE 1812Aa [= 18°00′–18°15′S 12°00′–12°15′E]
Churutabis [Farm]: 108 SE 2717Ad [= 27°15′–27°30′S, 17°15′–17°30′E]
Gamsberg east of Pass: 23°19′S 16°31′E
Ganab: 23°06′S 15°33′E
Gaub Pass to Kuiseb Pass: 23°27′S 15°46′E
Gaub River bed: 23°29′S 15°46′E
Gelaus 6 [Farm]: SE2717Da [= 27°30′–27°45′S 17°30′–17°45′E]
Ghaub: 19°29′S 17°47′E

Gibeon, 41 km SW: 21°20′S 17°29′E
Gobabeb (also Gobabeb at Kuiseb River): 23°34′S 15°03′E
Grootberg Pass, W of: 20°10′S 14°04′E
Grootfontein, 10 km NE: 19°30.56′S 18°12.44′E
Grootfontein, 40 km NE: 19°20′S 18°23′E
Gutscha Pan: 19°48′S 20°35′E
Halali in Etosha National Park: 19°02′S 16°58′E
Helmeringhausen, 30 road km from: 25.53°S 16.35°E
Helmeringhausen, 34 km SE: 26°05′S 16°38′E
Helmeringhausen, 32 km SW: 26°06′S 16°36′E
Helmeringhausen, 76 km from on road to Spes Bona: 25°35′S 16°20′E
Hentiesbaai: 22°08′S 14°18′E
Hentiesbaai, 20 km NE: 21°58′S 14°22′E
Hentiesbaai, 33 km NW: 21°52′S 14°05′E
Homeb, N of: 23°38′S 15°13′E
Kalkfeld, 18 km NE: 20°45′S 16°16′E
Kalkfeld, 25 km NE: 20°41′S 16°18′E
Kamanjab, 5 km S: 19°39′S 14°51′E
Karasburg, 30 km E: 28°00′S 19°03′E
Karas Mountains: 27°09′S 19°01′E
Karibib, 15 km W: 21°56′S 15°42′E
Kaross Farm: 19°23′S 14°40′E
Khan River 23 km N Karibib: 21°47′S 15°57′E
Khorixas, 2 km W: 20°23′S 14°56′E
Khorixas, 4 km E: 20°22′S 15°00′E
Khorixas, 120 km from on road to Palm: 20°17′S 14°05′E
Klein-Aus Vista: 26°39′S 19°25′E
Kombat: 19°43′S 17°43′E
Kuiseb, between and Gaub passes: 23°24′S 15°50′E
Kuiseb River Delta near Rooibank: 23°12′S 14°39′E
Kuiseb River near Gobabeb: 23°34′S 15°03′E
Leeu River 9 km W Okahandja: 21°58′S 16°50′E
Lüderitz: Agate Beach: 26°37′S 15°10′E
Luderitz: Diaz Point: 26°39′S 15°05′E
Lüderitz, Grosse Bucht: 26°39′S 15°05′E
Mariental, 5 km S: 24°41′S 17°57′E
Messum River: 21°15.31′S 14°28.17′E
Mirabeb: 23°27′S 15°21′E
Namib Desert Park, SE corner of: SE 2315Db [= 23°30′–23°45′S 15°45′–16°00′E]
Namib Desert Research Station: 23°33′45″S 15°02′38″E
Namuskluft 88 [Farm]: SE 2716Dd [= 27°45′–28°00′S 16°45′–17°00′E]
Naukluft: 24.3°S 16.2°E [= 24°18′S 16°12′E]
Okahandja, ca 30 km W: 21°55.56′S 16°31.61′E
Okandukaseibe Farm 47 km S Wilhelmstal: 22°20′S 16°21′E
Okaukuejo: 19°11′S 15°55′E
Okosongomingo Farm 50 km ESE Otjiwarongo: 20°39′S 17°05′E
Omaruru, 6 km N: 21°22′S 15°59′E
Omaruru, 32 km W: 21°29′S 15°43′E
Omaruru, between and Wilhelmstal: 21°31′S 16°03′E
Ondangwa, 38.4 km: SE SE1618Ab [= between 16°00′S and 16°15′S, 18°15′E and 18°30′E]
Ondorusu Falls: SE 1713 Bd [= 17°15′–17°30′S 13°45′–14°00′E]
Onze Rust 192 [Farm]: 24°09′S 18°02′E

Ortmansbaum near Warmbad: SE2818 Bd [= 28°15′–28°30′S 18°45′–19°00′E]
Osire: 21°01′S 17°21′E
Otjikoko-Süd [Farm]: 2116 Ad [= 21°15′–21°30′S 16°15′–16°30′E]
Otjinungwa: SE 1712Ac [= 17°00′–17°15′S 12°15′–12°30′E]
Otjiwarongo, 28 km NW: 20°21′S 16°27′E
Otjiwarongo, 44 km SW: 20°37′S 16°22′E
Popa Falls: 18°07′S 21°33′E
Regenstein: SE 2217Ca [= 22°30′–22°45′S 17°00′–17°15′E]
road C26 60 km E from road C14: 23°15′S 16°16′E
road 511 to Mata Mata 2 km from road C17: 25°37′S 19°25′E
Rooibank: 23°11′S 14°39′E
Rosh Pinah, 16 km S: 28°04′S 16°51′E
Rundu: 17°56′S 19°46′E
Rundu, 25 km E: 17°57′S 19°57′E
SE 1918 Cd [= 19°45′–20°00′S 18°15′–18°30′E]
SE 2719 Ca [= 27°30′–27°45′S 19°00′–19°15′E]
Spitzkopje: approximately 21°39′S 15°10′E
Spitzkoppe 17 km from Usakos: 21°59′S 15°35′E
Stampriet, 71 km E: 24°09′S 19°00′E
Stampriet, 18 km SE on road to Goachas: 24°28′S 18°30′E
Swakopmund, 21 km E on road to Usakos: 22°36′S 14°42′E
Swakopmund, 10 km N: 22°35′S 14°32′E
Swakopmund, 63 km NE: 22°24′S 15°02′E
Swakopmund, 110 km NNW : 21°50′S 14°05′E
Swakopmund, 113 km NNW: 21°51′S 14°05′E
Swakopmund, 33 km from on road to Usakos: 22°34′S 14°49′E
Swakopmund, 97 km from on road to Usakos: 22°10′S 15°10′E
Swakopmund, 117 km from on road to Usakos: 22°02′S 15°17′E
Swakop River at bridge near mouth: 22°42′S 14°32′E
Swakop River mouth : 22°42′S 14°32′E
Takuasa: SE 1720Cd [= 17°45′–18°00′S 20°15′–20°30′E]
Tses to Bersheba: 25°55′S 17°56′E
Ugab River 12 km SE Outjo: 20°09′S 16°14′E
Uguchab River near Aurusberg: 27°32′S 16°11′E
Uis Myn, 94 km from coast on road to: 21°26′S 14°45′E
Usakos, 8 km W: 21°59′S 15°31′E
Vaalbank 319 [Farm]: 23°54′S 18°53′E
Vogelstrausskluft 87 [Farm]: SE 2717Ba [= 27°00′–27°15′S, 17°30′–17°45′E]
Waldau River 17 km W Okahandja: 21°57′S 16°45′E
Walvis Bay, 11 km E: 22°59′S 14°37′E
Walvis Bay, 9 km NE: 22°52′S 14°33′E
Wasservallei: 22°55′S 16°22′E
Waterberg : 20.5°S 17.3°E [= 20°30′S 17°18′E]
Windhoek: 22°34′S 17°05′E

SOUTH AFRICA

Cape of Good Hope Nature Reserve near Olifantbosbaai: 34°16′S 18°23′E
Clifton Farm 18 km NW Grahamstown: 33°11′S 26°24′E
Constantia, Cape Town: 34°02.6′S 18°25.8′E
Dassiefontein Farm 14 road km E Kamieskroon: 30°09.3′S 17°59.6′E
Dikbome Farm (on Merweville–Koup road): 32°53′S 21°22′E
D'Nyala Nature Reserve: 23°45′S 27°49′E
Elandsheuwels Farm 40 km W Steytlerville: 33°16.5′S 23°55.2′E

Matjiesfontein: 33°14′S 20°35′E
Mogol Nature Reserve: 23°58′S 27°45′E
Goodehoop Farm 16 km W Steytlerville: 33°14.7′S 24°17.3′E
Hilton Farm 18 km WNW Grahamstown: 33°16′S 26°21′E
Kalkgat in Knersflakte: 31°07′30″S 18°55′30″E
Karoo National Park, Mountain View: 32°15′S 22°32′E
Konstabel Farm 30 km WSW Matjiesfontein: 33°16′S 20°17′E
Langjan Nature Reserve: 22°52′S 29°14′E
Loskop Dam Nature Reserve: 25°25′S 29°20′E
Modjadji Nature Reserve: 23°38′S 30°20′E
Mogoto Nature Reserve near Zebediela: 24°15′S 29°13′E
Nylsvley Nature Reserve: 24°39′S 28°42′E
Pafuri in Kruger National Park: 22°26′S 31°12′E
Pakhuis Pass: 32°08.1′S 18°59.7′E
Paleisheuwel: 32°28′S 18°43′E
Pretoria, Botanical Garden: 25°44′S 28°16′E
Pretoriuskop in Kruger National Park: 25°09′S 31°16′E
Riversdale, 24 km SE: 34°11.3′S 21°26.9′E
Robertson, 5 km W: 33°49′S 19°49′E
Rustenburg Nature Reserve: 25°40′S 27°12′E
Sevilla 40 km E Clanwilliam: 32°05.1′S 19°05.4′E (incorrectly recorded as W Clanwilliam on the specimen labels)
Skukuza in Kruger National Park: 24°59′S 31°36′E
Steytlerville, 2 km N: 33°20.0′S 24°22.0′E
Steytlerville, 3 km N: 33°18.3′S 24°22.0′E
Steytlerville, 6 km N: 33°16.8′S 24°22.9′E
Swartrivier 7 km NW Prince Albert: 33°10′S 21°59′E
Tierberg Farm 23 km NE Prince Albert: 33°10′S 22°15′E
Tswaing: 25°24′S 28°06′E
Tussen Die Riviere Game Reserve: 30°30′S 26°08′E
Waaipoort Pass 19 km ENE Steytlerville: 33°14.8′S 24°19.8′E
Willowmore, 9 km E: 33°15′S 23°34′E
Willowmore, 43 km NE at Plessierivier: 33°08.3′S 23°50.4′E
Willowmore, 37 km NW in Grootrivierberg Range: 33°11.5′S 24°09.5′E
Willowmore, 11 km SW: 33°22.3′S 23°24.7′E
Wolwekraal Farm 28 km S Steytlerville: 33°32.8′S 24°21.3′E
Wolwekraal Farm 30 km S Steytlerville: 33°33.9′S 24°20.9′E
Worcester, 24 km W: 33°40.2′S 19°14.3′E
Ysterfontein Farm 11 km W Clanwilliam: 32°04.8′S 18°40.7′E (named Willie Nel Farm on the specimen labels and incorrectly recorded as 32°10.8′S 18°53.5′E)

Tanzania
Bahari Beach 20 km N Dar es Salaam: 6°38.9′S 39°12.3′E
Chalinze, 17 km E: 6°39.2′S 38°30.2′E
Dodoma, 74 km E: 6°05.0′S 36°24.4′E
Iringa: 7°46.0′S 35°40.9′E
Iringa, 75 km ENE: 7°38.2′S 36°15.7′E
Iringa, 12 km NNE: 7°41.7′S 35°44.3′E
Iringa, 18 km W: 7°53.8′S 35°35.7′E
Itigi: 5°42′S 34°29′E
Kisiwani, 27 km SE Same: 4°07.7′S 37°56.6′E
Korogwe, 73 km NW: 4°40.8′S 38°06.4′E
Korogwe, 84 km NW: 4°37.5′S 38°01.8′E

Korogwe, 11 km SW: 5°14.2′S 38°24.7′E
Korogwe, 33 km SW: 5°20.2′S 38°15.8′E
Mabokweni, 10 km WNW: 4°59.6′S 38°59.0′E
Mikumi: 7°24.2′S 36°58.7′E
Mikumi, 3 km S: 7°25.6′S 36°59.1′E
Mkomazi, 2 km NE: 4°37.8′S 38°05.5′E
Mkomazi Game Reserve, Dindera Dam area: 3°55′S 37°49′E
Mkomazi Game Reserve, Ibaya: 3°58′S 37°48′E
Mkomazi Game Reserve, Kikolo Plot: 4°07′S 38°02′E
Mombo: 4°52.5′S 38°16.5′E
Morogoro, 43 km E: 6°39.1′S 38°01.5′E
Morogoro, 60 km ENE: 6°38.1′S 38°07.8′E
Morogoro, 11 km W: 6°52.5′S 37°35.7′E
Morogoro, 48 km W: 6°56.9′S 37°20.2′E
Morogoro, 50 km NW: 6°24.1′S 37°24.8′E
Morogoro, 60 road km SW: 7°01.4′S 37°15.7′E
Morogoro, 62 road km SW: 7°02.5′S 37°15.3′E
Morogoro, ca 100 km NW: 6°08.3′S 36°56.7′E
Pangani River Camp 86 km NW Korogwe: 4°37.3′S 38°00.7′E
Pugu Forest near Kisarawe: 6°54.0′ 39°05.6′E
Ruaha River bank 7 km S Mikumi: 7°27.4′S 37°00.5′E
Same, 12 km NNE: 3°56.8′S 37°40.2′E
Same, 24 km NNE: 3°52.2′S 37°38.7′E
Same, 61 km NNE: 3°35.6′S 37°32.8′E
Same, 18 km S: 4°13.0′S 37°46.0′E
Same, 19 km SE: 4°05.3′S 37°53.6′E
Udzungwa National Park 132 km E Iringa: 7°31.8′S 36°39.7′E
University of Dar as Salaam campus: 6°47.2′S 39°12.2′E

Zambia

Chibombo 97 road km N Lusaka: 14°39′S 28°10′E
Chilanga 15 km S Lusaka: 15°34′S 28°16′E
Chipata, 50 km NW: 13°25′S 32°19′E
Chipata, 60 km SW: 13°57′S 32°12′E
Choma, 5 km E: 16°47′S 27°02′E
Choma, 56 road km NE: 16°37′S 27°20′E
Kacholola, 38 km W: 14°54′S 30°22′E
Kafue, 8 km S: 15°52′S 28°13′E
Kalomo, 22 km E: 17°01′S 26°41′E
Kalomo, 7 km SW: 17°02′S 26°26′E
Kalomo, 9 km SW: 17°04′S 26°25′E
Kapiri Mposhi, 14 km E: 13°55′S 28°45′E
Kapiri Mposhi, 25 km SSW: 14°10′S 28°36′E
Kasama, 60 km N: 9°42′S 31°10′S
Kasama, 76 km S: 10°52′S 31°06′E
Katete, 11 km SE: 14°09′S 32°04′E
Katombora: 17°50′S 25°26′E
Luangwa, E side of bridge: 14°59′S 30°13′E
Lusaka, ca 20 km E International Airport: 15°21′S 28°29′E
Lusaka, 25 km E: 15°21′S 28°30′E
Lusaka, 65 km WNW: 15°10′S 27°25′E
Lusaka International Airport: 15°19′S 28°27′E
Mbala, 16 km W: 8°53′S 31°16′E

Mfuwe, 6–18 km SW: 13°07′S 31°45′E
Monze: 16°16′S 27°28′E
Mpika, 78 km SSW: 12°25′S 31°04′E
Mpulungu, near: 8°48′S 31°05′E
Mumbwa, 2 km E: 15°01′S 27°04′E
Mumbwa, 6 km W: 15°02′S 27°00′E
Pemba, 18 km NE: 16°30′S 27°24′E
Petauke, 27 km E: 14°18′S 31°34′E
Petauke, 31 km E: 14°18′S 31°36′E
Petauke, 32 km E: 14°17′S 31°37′E
Petauke, 42 km WSW: 14°30′S 31°02′E
Petauke, ca 210 road km WSW: 15°04′S 29°44′E
Rufunsa, 50 km W: 15°12′S 29°13′E
Serenje, 30 road km NE: 13°04′S 30°25′E
Serenje, 54 road km NE: 13°05′S 30°35′E
Serenje, 65 road km NE: 13°01′S 30°40′E
Serenje, 82 road km NE: 12°55′S 30°45′E
Wildlife Camp (at Luangwa River 7 km SW Mfuwe): 13°06′S 31°45′E

Zimbabwe
Bembezi Lodge: 19°39′S 28°42′E
Bulawayo airport: 20°00′S 28°38′E
Bulawayo: Hillside: 20°12′S 28°37′E
Bulawayo: Umguza River: 20°05′S 28°37′E
Charara 20 km ESE Kariba: 16°33′S 28°58′E
Dawn Mine 45 km NE Bulawayo: 19°48′S 28°45′E
Harare: Mukuvisi Game Park: 17°50′S 31°05′E
Kami (= Khami) Ruins: 20°09′S 28°26′E
Kariba: 16°32′S 28°49′E
Leighwoods 52 km SW Bulawayo: 20°26′S 28°15′E
Lion and Cheetah Park 24 km W Harare: 17°50′S 30°49′E
Matobo (= Matopos) National Park: 20°35′S 28°40′E
Mbizi Game Reserve (= Rocky Farm) 20 km SE Harare: 17°58′S 31°08′E
Nyamandhlovu, 11 km NE: 19°48′S 28°16′E
Nyamandhlovu, 7 km WSW: Kami River: 19°53′S 28°13′E
Redbank at Kami River: 20°00′S 28°22′E
Sawmills at Umguza River: 19°35′S 28°02′E
Trelawney Research Station WNW Harare: 17°32′S 30°28′E
Victoria Falls: 17°56′S 25°50′E

GENUS *TACHYSPHEX*

Tachysphex Kohl, 1883a:166. Type species: *Tachysphex filicornis* Kohl, 1883 [= *Tachytes fugax* Radoszkowski, 1877], designated by Bingham, 1897:192.

Schistosphex Arnold, 1922:137. Type species: *Schistosphex breijeri* Arnold, 1922, by original designation and monotypy [= *Tachysphex marshalli* R. Turner, 1917].

Atelosphex Arnold, 1923a:177. Type species: *Atelosphex miscophoides* Arnold, 1923 [= *Tachysphex brevipennis* Mercet, 1906], by original designation and monotypy.

Generic diagnosis.— *Tachysphex*, a member of Larrini as defined by Bohart and Menke (1976), has the hindocellus modified to a flat, elongate scar; a part of each scar is bordered by a narrow, translucent band, the only remnant of a lens (the band is broadly interrupted on the scar's outer, posterolateral, or lateral side, depending on its orientation). Within Larrini, *Tachysphex* belongs to the subtribe Gastrosericina (= Tachytina), in which the frons is evenly convex around the midocellus and lacks well-defined paraorbital swellings, and the anterior branch of lens scar is markedly longer than the posterior branch or (in *Parapiagetia*) the branches form a circle (scar length markedly more than midocellar diameter except slightly so in *Parapiagetia*). In *Larrina*, the frons is concave around the midocellus and has a paraorbital swelling, and the hindocellar scar consists of two parallel branches of nearly identical length and parallel to each other (scar length slightly more than midocellar diameter).

Within Gastrosericina, *Tachysphex* has no single character that would separate it from the other genera. Rather, it can be distinguished by the lack of their specializations, which are:

1. *Gastrosericus*: two rather than three submarginal cells.
2. *Holotachysphex*: clypeal lobe pointed (sharply or roundly), not angulate laterally but flanked by small tooth or oblique carina adjacent to free margin; foretarsal rake absent in both sexes (outer margin of forebasitarsus without preapical spines); hindtibial dorsum with one or two inconspicuous, nearly appressed bristles instead of spines; tergum II with lateral line; pygidial plate absent in female; male hindtarsomeres II–IV almost parallel-sided except basally; male sterna II–III or II–IV with large patches of velvety pubescence; and nest established in hollow twigs.
3. *Kohliella*: frons with a V–shaped swelling, mandible with subbasal, oblong tubercle; third submarginal cell petiolate posteriorly; lateral carina of tergum I evanescent behind spiracle and absent posteriorly; female claws with subbasal tooth.
4. *Larropsis* (including *Ancistromma*): frons with ill-defined paraorbital swelling; propodeal dorsum glabrous (partly glabrous in several *Tachysphex*).
5. *Parapiagetia*: gastro-propodeal articulation with a pair of sclerites ventrally.
6. *Prosopigastra*: tergum I with short, oblique carina that extends from each anterolateral corner; female tergum VI flattened, margins of tergum and pygidial plate forming an angle of about 10–20° (forming an angle of about 30–40° in *Tachysphex*).
7. *Tachytella*: frons with median, slightly raised, flat area that is delimited by lateral sulcus (sulci subparallel, close to orbit); pronotal collar rounded and reaching scutum level; submarginal cell III essentially rhomboidal (anterior and posterior margins equal in length or nearly so); hindwing jugal lobe short, ending well before crossvein cu-a (the jugal and anal excisions thus widely separated).
8. *Tachytes*: hindocellar scar elongate, longer than distance that separates it from midocellus; female hindfemur in most species with apical lobe.

Relationships and species groups.— In the past, attempts were made to arrange the species according to their putative relationships by assigning them to species groups. The groups were first recognized by de Beaumont (1936, 1947) in his revisions of French and Egyptian species. Pulawski (1971, 1974, 1977, 1988) rejected some unreliable characters used in group recognition, added previously unnoticed ones, combined some of de Beaumont's groups, established new groups, and expanded the system to include all Palearctic and also the Australian and New World species.

Although based solely on traditional phenetic criteria that were never clearly defined (overall similarity, degree of difference), the group system was useful for comparative and descriptive purposes. Some groups appear to be well supported monophyletic lineages (the *albocinctus*, *brevipennis*, *erythropus*, *geniculatus*, *julliani*, *terminatus*, and *undatus* groups). Krombein and Pulawski (1995), however, abandoned the use of species groups because of problems with their delimitation. Also, the system has the following fatal flaws:

1. The largest group, the *pompiliformis* group, has no supporting synapomorphy and is a paraphyletic assemblage of species that could not have been placed elsewhere.
2. The second and the third largest groups, the *brullii* and the *panzeri* groups, break down when the world fauna is considered (see below for details).
3. Five of the groups were monotypic, stressing the unusual morphological characters of the included species, but providing no information about relationships among species.
4. The *geniculatus* group most likely developed from a member of the *panzeri* group. Recognition of the *geniculatus* group, therefore, made the *panzeri* group paraphyletic.
5. The two species of the *plicosus* group, *mediterraneus* and *plicosus*, share no unique synapomorphy, although each of them has conspicuous unique structures. The only feature that grouped them together is the *Oecanthus* prey, believed to be unique within the genus. The group, therefore, is likely to be another assemblage of unrelated species.

The following 16 groups have been recognized:

(1) *albocinctus* group of de Beaumont, 1940 (xeric areas of the world except North and Central America). Propodeal posterior face flattened mesodorsally (intersecting dorsum at about right angle), forebasitarsus expanded apicolaterally over the rake base (Figs. 15c, d), except in occasional males, female tarsomeres III and IV simple, male sterna IV–VI largely or totally glabrous, hindwing jugal lobe broadened, although less so in *aborigenus* than in *pilosulus* or *albocinctus* (as in Fig. 102a), and penis valve with ventral, preapical projection (Figs. 14f, g) except in *remotus* and *tenuisculptus*. The expanded forebasitarsus is shared with *aethiopicus* and its close relatives and with the female of the Australian *pugnator* R. Turner. In *aethiopicus*, however, the propodeal posterior face has a narrow median sulcus and the gastral setae are setose in the male, and in the female of *pugnator* tarsomeres IV and V are conspicuously modified (apparently for roach collecting). The included species are: *aborigenus* Pulawski, 1977 (Australia), *albocinctus* (Lucas, 1849), *brasilianus* Pulawski, 1974 (Brazil), *bruneiceps* Arnold, 1923, *indicus* Pulawski, 1994 (India), *laticauda* Gussakovskij, 1933 (southwest Asia), *maculipennis* Pulawski, 1977 (Australia), *multifasciatus* Pulawski, 1977 (Australia north of the Tropic of Capricorn), *pilosulus* R. Turner, 1908 (Australia), *remotus* Pulawski, 1974 (northern Colombia, northern Venezuela), and *tenuisculptus* Pulawski, 1977 (Australia). Prey consist of mantids, mostly juvenile ones. Behavioral data are available for *albocinctus* (summarized below under this species), *indicus* (Krombein and Pulawski, 1994), *multifasciatus* (Evans, Matthews, and Pulawski, 1976), and *pilosulus* (Evans, Matthews, and Pulawski, 1976; Alcock, 1980).

(2) *brevipennis* group of de Beaumont, 1940 (South Africa to Mediterranean Basin, India, Sri Lanka, and Transcaspia), originally named the *imperfectus* group but renamed by Pulawski, 1971, and corresponding to the genus *Atelosphex* Arnold (1923). Characterized by the total reduction of the episternal suture, a unique synapomorphy within the tribe Larrini. Included species: *brevipennis*, *carli* de Beaumont (Spain, northern Morocco), and *sympleuron* Pulawski (India, Sri Lanka). Prey consists of acridids (Pulawski, 1974b).

(3) *brullii* group of de Beaumont, 1936 (cosmopolitan), originally named the *spoliatus* group (*spoliatus* Giraud is a junior synonym of *brullii* F. Smith); includes the *obscuripennis* group of de Beaumont, 1936 (originally named the *lativalvis* group but *lativalvis* Thomson is a junior synonym

of *obscuripennis* Schenck) and the *graecus* group of de Beaumont, 1947. The group is defined by various apomorphies of the apical female tarsomeres, such as apicoventral margin convex or produced into a lobe (Pulawski 1971, 1988), and tarsomere IV as long as wide or wider. No group character is known for the males, which cannot be separated from those of the *pompiliformis* group. For practical purposes Pulawski (1977:219, 1988:168) recognized two subgroups, in spite of intermediate species found in Australia. The *brullii* subgroup was characterized essentially by elongate apical tarsomeres and claws, and the *obscuripennis* subgroup by tarsomere IV wider than long, tarsomeres V angulate basoventrally, and the foretibia without spines on the outer side. However, the South American *acutemarginatus* Strand was assigned to the *brullii* group following different criteria (Pulawski, 1974). In that species, the apicoventral margin of the apical tarsomere is straight, but the body sculpture is fine and the propodeal dorsum is covered with erect setae, slightly inclined posterad, two characters found in all Neotropical members of the *brullii* group. Similar confusing cases are found in Sri Lankan species. Members of this group provide their nests with tettigoniids (*brullii* subgroup) and blattids (*obscuripennis* subgroup).

(4) *erythropus* group of de Beaumont, 1936 (South Africa to Mediterranean Basin, India, Sri Lanka, and Transcaspia), originally named *fluctuatus* group and renamed by Pulawski (1971). Most members of this group are recognized by the combination of: hindwing vein cu-a oblique (Fig. 102a), apical depression of sternum I bisected by a longitudinal, obtuse carina (Fig. 132a), and in the male, presence of conspicuous fimbriae (e.g., Fig. 101) on the apical depression of at least sternum III (the fimbriae are either erect or appressed). Vein cu-a, however, is vertical or nearly so in many South African *costae*, some *schoenlandi*, and some Sri Lankan *sericeus*. Included species: *costae, detritus, erythropus, flavofimbriatus, grandissimus, osiris, schoenlandi, sericeus*, and *sordidus*. Prey, known only for *costae* and *schoenlandi*, consists of mantids, mostly juveniles.

(5) *euxinus* group of Pulawski, 1971 (Bulgaria to Lebanon). Monotypic. Characterized by the conspicuously fimbriate male sterna (as in the *erythropus* group but with unspecialized hindwing venation and simple sternum I). No group character is known for the female. Prey unknown.

(6) *geniculatus* group of de Beaumont, 1940 (North Africa, Middle East, Kenya, Tanzania), originally named the *luxuriosus* group and renamed by Pulawski, 1971. With the same characteristics as the *panzeri* group (see below), but postocellar area unusually broad (width more than twice length) and male forefemur not emarginate. Included species: *geniculatus, horus, inextricabilis, luxuriosus*, and *niloticus*. Prey unknown.

(7) *isis* group of de Beaumont, 1947 (Libya to Syria). Monotypic. Hindwing vein cu-a as in the *erythropus* group, but sternum I unspecialized and male sterna largely glabrous. Prey unknown.

(8) *julliani* group of de Beaumont, 1936 (South Africa to Mediterranean Basin, India, Southeast Asia and Mongolia, northern South America, western North America). In the female, the pygidial plate is either unusually broad or has a distinctive sculpture, and the preapical bristles of gastral segments IV and V, in most species, are conspicuously thickened. Male sterna are either glabrous or (some species) sparsely pruinose. The propodeal dorsum intersecting posterior face at about right angle is a subsidiary recognition feature of the group. The broad pygidial plate of the female and the asetose male sterna (at least mesally) are shared with the *albocinctus* group, in which, however, the forebasitarsus is expanded apicolaterally. Included species: *argentatus, argenticeps, crocodilus, curvipes, deserticola, desertorum, dignus, incanus, julliani, mauretanus, vestitus, vulneratus*, and the extralimital *cockerellae* Rohwer, 1914 (western USA to Colombia and Venezuela), *coquilletti* Rohwer, 1911 (western USA, Mexico), *rugicauda* Pulawski, 1994 (Tamil Nadu State of India), and *testaceipes* Bingham, 1897 (Burma, Laos, Thailand). Mantids are used as prey (known only for *cockerellae, coquilletti*, and *julliani*).

(9) *mendozanus* group of Pulawski, 1974 (Argentina). Monotypic. Gaster conspicuously

punctate, without pygidial plate in the female. A previously unnoticed recognition character is the shape of the female scutum whose lateral margin is not raised into a flange. Prey unknown.

(10) *nepharius* group of Pulawski, 1977 (Australia). Monotypic. The only species of the group, known from a single female, is unique in having a nonemarginate (slightly stepped) posterior mandibular margin, clypeus not protruding mesally into a lobe, sternum II with erect setae basally, and ill-defined pygidial plate. Prey unknown.

(11) *panzeri* group of de Beaumont, 1936 (South Africa to central Europe, eastwards to India, Sri Lanka, China, and Mongolia; unpublished records include Thailand). Characterized by a convex labrum that protrudes beyond the clypeal margin, galea longer than wide in profile, a narrow postocellar area (width less than length), and a basally emarginate male forefemur. Unlike the *undatus* group, which has a similar labrum, the postocellar area is inconspicuously punctate in the *panzeri* group. Also, the setae are appressed on the postocellar area in most species (erect in *fulgidus*, *hadronyx*, and *tennicornis*), while erect in the *undatus* group. Prey: acridids. The group is easily recognized in the Palearctic and Oriental regions, but convergence and intergradation blur its limits elsewhere. Clearly, the convex labrum is an independent developments in the Neotropical *remotus* (a member of the *albocinctus* group) and the Australian *pugnator* Turner (*brullii* group). Several perplexing cases are found among the Afrotropical species. In *marshalli* and *quadricolor*, for example, the labrum is convex in most specimens, but flat in the smallest males. In *asinus*, the labrum is convex, but the specialized female tarsi suggest that the species is not a member of the *panzeri* group; the male, however, is strikingly similar to *rhodesianus*, a typical representative of the group. In *fulgidus*, the labrum is convex, but the propodeal sculpture and female clypeus are unlike any member of the *panzeri* group. The labrum is slightly convex in *waltoni*, which is not likely to be a member of the *panzeri* group, and only slightly more convex in *claripes* and *diabolicus*, which appear to be members of the group. Included species: *aemulus*, *atlanteus*, *brevipecten*, *brinckerae*, *buyssoni*, *caliban*, *cheops*, *chephren*, *dissimulatus*, *excavatus*, *gracilicornis*, *gracilitarsis*, *incertus*, *lacertosus*, *liriformis*, *longipalpis micans*, *mocsaryi*, *mycerinus*, *notogoniaeformis*, *palopterus*, *panzeri*, *ptah*, *pulcher*, *ramses*, *rhodesianus*, *sycorax*, *ziziphi*, and the following extralimtal species: *conclusus* Nurse (India), *diadelus* Pulawski (Sri Lanka), *fuscispina* Pulawski (Turkmenistan), *liriformis* Pulawski (Middle East to Tajikistan), *lucillus* Pulawski (Turkmenistan), *noar* Pulawski (Sri Lanka), *obscurus* Pulawski (Canary Islands), *persa* Gussakovskij (Egypt to Central Asia), *piloselus* Pulawski (Kazakshtan, Turkmenistan), *pseudopanzeri* de Beaumont (SW Europe, NW Africa), *sericans* Gussakovskij (North Africa to Central Asia), *svetlanae* Pulawski (Central Asia), *tessellatus* Dahlbom (Greece, Turkey), and *rubicundus* Pulawski (Central Asia). The labrum is less convex in the following species which may or may not be related to the *panzeri* group: *ashmeadii* W. Fox (North America), *claripes*, *diabolicus*, *lacertosus*, *marshalli*, *psilonotus*, *punctatus*, *quadricolor*, and *ziziphi*.

(12) *plicosus* group of de Beaumont, 1936 (Africa to Mediterrancan Basin, India, Sri Lanka, and Mongolia), originally named *mediterraneus* group but renamed by Pulawski, 1971. The two included species, *mediterraneus* and *plicosus*, share no synapomorphy, although each of them has various unique structures. The only feature that grouped them together is the prey, tree cricket of the genus *Oecanthus*, believed to be unique within the genus (but sometimes used by the Nearctic *mundus* W. Fox, a member of the *brullii* group).

(13) *pompiliformis* group of de Beaumont, 1936 (cosmopolitan), originally called the *pectinipes* group (*pectinipes* was a misdetermination of *pompiliformis*); includes the *nitidus* group of de Beaumont, 1940, and the *speciosissimus* group of de Beaumont, 1940. A heterogeneous assemblage of unassigned species. Most species prey upon acridids, but *fulvitarsis* and two Nearctic species, *semirufus* (Cresson) and *tipai* Pulawski, collect tettigoniids.

(14) *schmiedeknechti* group of de Beaumont, 1940 (Africa to Transcaspia). Described as monotypic, but *prosopigastroides* is clearly related. Characterized by a coarse mesothoracic sculpture, a triangularly prominent supraantennal swelling, flattened female flagellomeres IV–X, and a unique shape of the volsella and penis valve (Figs. 342h, 291). Prey: mantids.

(15) *terminatus* group of Pulawski, 1974 (New World). Defined by the presence of a callosity behind each postocellar scar and, in addition, a flat labrum, unmodified tarsomeres, and setae of the propodeal dorsum oriented toward the thorax. Included species: *alpestris* Rohwer, *antillarum* Pulawski, *apicalis* W. Fox, *clarconis* Viereck, *galapagensis* F. Williams, *linsleyi* Bohart, *peruanus* Pulawski, *ruficaudis* (Taschenberg), *similis* Rohwer, *terminatus* F. Smith. Prey: acridids.

(16) *undatus* group of Pulawski, 1974 (South America). As in the *panzeri* group, the labrum is convex and conspicuously projecting beyond the clypeal margin. Unlike that group, the postocellar area has well-defined punctures in the *undatus* group and is covered with erect setae. Included species: *advenus* Pulawski, *apoctenus* Pulawski, *breviceps* Pulawski, *conceptus* Pulawski, *undatus* F. Smith. Prey: acridids.

Two additional, apparently monophyletic groups can be recognized among sub-Saharan species: **(17) *asinus* group**. Characterized by shortened female middle tarsomeres: the length of midtarsomere II is less than twice apical width; also, the length of midtarsomere III is about equal to its apical width (except 1.2 × apical width in *ulonyovu* and 1.3 × apical width in *ovambo* and *spectrum*). In all other *Tachysphex*, the midtarsomere II is at least twice as long as wide, and midtarsomere III at least 1.3 × as long as wide (length variable in *rhacodes*). Prey, known only for *asinus*, *gryllivorus*, and *oberon*, consists of nymphal gryllids. Included species: *asinus*, *bipustulosus*, *brachypus*, *carinatus*, *eurystoma*, *mashona*, *oberon*, *onager*, *ovambo*, *scaber*, *spectrum*, *ulonyovu*, and the Sri Lankan *gryllivorus* Pulawski; **(18) *pentheri* group**. As in the *panzeri* and *geniculatus* groups, the labrum is markedly convex and protruding beyond the clypeal free margin. Unlike these groups, the upper metapleural pit is oblong (rather than rounded), the setae of the propodeal dorsum diverge obliquely anterad from the midline, and (except in *usakos*) male sterna V and VI have each a subbasal fringe of dense, as if agglutinated setae, although the fringes are visible only when the sterna are fully extended. Prey, known only for *pentheri*, consists of immature acridids. Included species: *aethiopicus*, *excisus*, *frigidus*, *melanius*, *miniatulus*, *montivagus*, *pentheri*, *rotundus*, *ruber*, *thysanomerus*, and *usakos*.

Some of the Afrotropical species (e.g., *fulgidus*) do not fit any of the above groups.

CLADISTIC ANALYSIS.— Selection of characters for the analysis proved to be difficult, as many features excellent in recognition of individual species are too variable when the whole genus is considered (e.g., length of setae on the vertex, mesopleural sculpture, sculpture of the propodeal dorsum and side, male foretarsal rake, etc.). The following is the list of characters used (for data matrix, see Appendix II):

0. Labrum (surface): 0. flat, 1. moderately convex, 2. markedly convex.
1. Labrum (free margin): 0. entire, 1. emarginate.
2. Labrum (setae of the free margin): 0. long, thin, 1. short, stout.
3. Galea (texture): 0. sclerotized, 1. membranous.
4. Galea (length): 0. no longer than wide in profile, 1. longer than wide in profile.
5. Mandibular notch: 0. present, 1. absent.
6. Mandibular notch (size): 0. medium, 1. unusually small (as in *hadronyx* and *tenuicornis*).
7. Malar space: 0. absent, 1. present.
8. Clypeus: 0. variously shaped but not as in 1, 1. pointed and flanked by small tooth or carina.
9. Antennal socket: 0. rim of equal height, 1. rim higher dorsally than ventrally (*bipustulosus*, *mashona*, *pusulosus*).

10. Supraantennal swelling (presence and sculpture): 0. absent, 1. present, glabrous, 2. evanescent, fully setose (*asinus*, *carinatus*, *onager*, *scaber*, *sexinus*, *spectrum*, *ulonyovii*).
11. Supraantennal swelling (size): 0. low (most *Tachysphex*), 1. enlarged.
12. Supraantennal swelling (shape): 0. not triangularly prominent, 1. triangularly prominent (*prosopigastroides*, *schmiedeknechti*).
13. Frons: 0. evenly convex, 1. with conspicuous protuberance.
14. Width of female vertex (minimum value): 0. less than twice width, 1. at least twice width.
15. Swelling behind postocellar scar: 0: absent, 1. present in female, 2. present in both sexes.
16. Scutum : 0. punctate, 1. reticulate.
17. Scutum: 0. with no longitudinal ridges, 1. ridges present.
18. Episternal sulcus: 0. present, 1. absent.
19. Metapleuron (flange): 0. narrow, 1. broadened.
20. Metapleuron (oblique carina beneath flange's anterior end): 0. absent, 1. present.
21. Metapleuron (prespiracular prominence): 0. absent, 1. present.
22. Upper metapleural pit: 0. round, 1. oblong.
23. Propodeum: 0. with no carina between side and posterior surface, 1. with carina.
24. Propodeal dorsum: 0. setose throughout, 1. glabrous at least apicomesally.
25. Propodeal posterior surface (dorsal third): 0. with median sulcus, 1. varying from median sulcus to wide impression (*costae*), 2. with wide impression.
26. Hindwing vein cu-a: 0. vein vertical or anal end closer to wing base, 1. varying (*aborigenus*, *asinus*, *buyssoni*, *costae*, *longipalpis*), 2. cubital end closer to wing base.
27. Hindcoxal dorsum: 0: without tooth, 1. with prominent tooth.
28. Hindtibial dorsum: 0: spinose, 1. with one or two inconspicuous bristles.
29. Hindtibial spur (rays): 0. thin, dense, 1. varying (thin to thick), 2. thick, sparse.
30. Tergum I (sculpture): 0. punctate throughout, 1. impunctate apicomesally.
31. Tergum I (setae): 0. all appressed, 1. at least partly erect.
32. Tergum II (lateral lines): 0. absent, 1. present.
33. Sternum I (longitudinal carina that bisects apical depression): 0. absent, 1. variable (present or absent), 2. present.
34. Female mandibular cleft: 0. narrow, 1. widely open.
35. Female flagellum (shape): 0. cylindrical or nearly so, 1. apical flagellomeres flattened.
36. Female flagellum (sensory areas): 0. absent, 1. present.
37. Female clypeus (center of free margin): 0. entire, 1. varying, 2. emarginate.
38. Female clypeal lobe (side of free margin): 0. not incised, 1. varying, incised or not incised, 2. with at least one incision.
39. Female scutum and scutellum: 0. moderately convex, 1. flattened.
40. Female forefemoral venter: 0. uniformly densely punctate or sparsely punctate basally, 1. impunctate or with large, sparse punctures.
41. Female foretibial outer surface (spines): 0. absent, 1. one or more spines present, 2. one or more erect bristles present.
42. Female foretarsomere I: 0. not expanded, 1. expanded apicolaterally.
43. Female foretarsal rake: 0. present, 1. absent.
44. Female foretarsomere IV: 0. both lateral margins of equal length, 1. outer margin shorter than inner margin.
45. Female midfemoral venter: 0. evenly curved, 1. expanded distally except contrastingly narrow preapically.
46. Female midtarsomere II (length): 0. more than twice apical width, 1. twice apical width, 2.less than twice apical width.
47. Female tarsomeres IV (proportions): 0. longer than wide, 1. as long as wide, 2. wider than long.
48. Female tarsomeres IV (dorsoapical emargination): 0. acutely angulate, 1. roundly emarginate, 2. obtusely angulate.
49. Female tarsomeres IV (apicoventral margin): 0. concave or straight, 1. convex.

50. Female apical tarsomeres: 0. not angulate basoventrally, 1. angulate basoventrally.
51. Female apical tarsomeres (ventral spines): 0. spines absent, 1. spines present.
52. Female apical tarsomeres (apicoventral margin): 0. straight, concave, or convex, 1. produced mesally into a lobe.
53. Female apical tarsomeres (lateral margin): 0. spines absent, 1. spines present.
54. Female claw (length): 0. of medium length, 1. claws elongate, at least twice length of arolium.
55. Female claws (symmetry): 0. equal in each pair, 1. outer claw shorter and thinner than inner claw (opposite on foretarsus).
56. Female tergum VI (transverse internal carina): 0. carina absent, 1. carina present.
57. Female pygidial plate (lateral carina): 0. well defined, 1. evanescent.
58. Female pygidial plate (punctures): 0. sparse (averaging more than 1 diameter apart mesally), 1. dense (averaging 1 diameter apart or less, at least mesally).
59. Female pygidial plate (integument): 0. punctate or aciculate, 1. apical portion granulose , uniformly microsculptured, or ridged (contrasting with remaining integument), 2 all granulose.
60. Female pygidial plate (apex): 0. narrow, 1. broadly rounded.
61. Female sterna IV–VI: 0. setae not thickened, 1. setae delimiting preapical depressions thickened.
62. Male flagellum: 0. uniformly sculptured, 1. with longitudinal sulcus.
63. Male mandible (trimmal carina): 0. well defined, 1. reduced distad of tooth.
64. Male clypeus (lobe corner): 0. corner present, 1. corner absent.
65. Male clypeus (lip): 0. lip arcuate, sinuate, or similar, 1. lip a fingerlike projection, reduced laterally.
66. Male forefemoral notch: 0. absent, 1. varying (present or absent), 2. present.
67. Male forefemoral notch (surface): 0. not margined, 1. margined on at least one side.
68. Male hindtarsomeres II–IV (lateral margins): 0. diverging posterad, 1. parallel-sided (except basally), as in *Holotachysphex hologna thus*.
69. Male apical tarsomeres (venter): 0. spines absent, 1. spines present.
70. Male apical tarsomere (lateral margin): 0. not expanded, 1. expanded (*auropilosus*, *changi*, *hippolyta*, *scaurus*).
71. Male sternum II (patches of velvety pubescence): 0. absent, 1. present.
72. Male sterna: 0. uniformly punctate, 1. sterna IV–VI largely or all impunctate.
73. Male sterna III–VI (apical setal fringes): 0. absent, 1. present.
74. Male sterna IV–VI (subbasal fringes): 0. fringes absent, 1. fringes present.
75. Volsella (dorsal process): 0. present, 1. absent (secondary process may be present near volsella's apex), 2, thin, elongate (as in *pentheri*).
76. Volsella (basodorsal portion): 0. not expanded, 1. expanded into acute process on cephalic side (as in *vulneratus)*.
77. Volsellar setae: 0: thin, 1. club-like.
78. Penis valve (preapical angular ventral projection): 0. absent, 1. present.
79. Penis valve (curvature): 0. straight or evenly curved, 1. markedly curved apically.
80. Penis valve (lamellar expansion in apical third or so): 0. absent, 1. present (as in *julliani*).

A preliminary cladistic analysis of Larrini by Pulawski and Prentice (unpublished) indicates the following relationships: ... + *Gastrosericus* + ((*Kohliella* + *Parapiagetia*) + (*Holotachysphex* + *Tachysphex*)). The following species (thought to be the most ancestral in their respective genera) were selected as the outgroup: *Gastrosericus simplex* Arnold, *Kohliella anula* Pulawski, *Parapiagetia genicularis* (F. Morawitz), *Holotachysphex mochii* de Beaumont, and *Holotachysphex turneri* Arnold. Most of the world species of *Tachysphex*, representing all the major lineages except *nefarius* Pulawski, have been included. Not included in the analysis are the species known from one sex only (e.g., *nefarius*), several currently unavailable species, and also the species with identical character coding (the following is the list of species used in the analysis and of those, in parentheses, that have identical character codes):

aethiopicus (*miniatulus*)
albocinctus (*laticauda*)
apoctenus Pulawski (*breviceps* Pulawski)
argentifrons (*drymobius* Pulawski, *rugosipleuris*, *silvestris*, *suavis*, *theseus*)
brevipennis (*sympleuron*)
brinckerae (*clypeatus*, *rhodesianus*)
consocius (*congoensis*)
coquilletti (*cockerellae*)
coriaceus (A. Costa) (*blattivorus* Gussakovskij)
diabolicus (*claripes*)
fugax (*ambiguus*, *amplus* W. Fox, *angustatus* Pulawski, *angustus*, *apricus* Pulawski, *arizonae* Pulawski, *asmara*, *ctenophorus* Pulawski, *erythrurus*, *idiotrichus* Pulawskis, *krombeini* Kurczewski, *laevifrons* (F.Smith), *lindbergi*, *miwok* Pulawski, *morosus* (F. Smith), *nitidior*, *oasicola* Pulawski, *opata* Pulawski, *pseudofasciatus*, *solaris* Pulawski, *stachi* de Beaumont, *tarsinus*, *texanus* (Cresson), *yolo* Pulawski, *yuma* Pulawski)
galapagensis Rohwer (*peruanus* Pulawski)
geniculatus, (*horus*, *inextricabilis*, *luxuriosus*, *niloticus*)
gujaraticus (*bohartorum* Pulawski, *crenulatus* W. Fox, *ebeninus*, *eldoradensis* Rohwer, *excelsus* R. Turner, *opacus* F. Morawitz, *spatulifer* Pulawski, *williamsi* Bohart)
helveticus aegyptiacus (*yarrowi*)
incertus (*dissimulatus*, *excavatus*)
jujuensis Brèthes (*subandinus* Pulawski)
julliani (*argentatus*)
lacertosus (*bemba*)
mocsaryi (*brevipecten*, *persa* Gussakovskij)
montivagus (*ulothrix*)
mycerinus (*atlanteus*, *pilosellus* Pulawski)
nitidus (*agnus*, *anubis*, *hermia*, *huchiti* Pulawski, *lamellatus* Pulawski, *nitidissimus*, *occidentalis* Pulawski, *psammobius* (Kohl), *sonorensis* (Cameron), *sulcatus* Pulawski, *tahoe* Pulawski, *tipai* Pulawski, *unicolor* (Panzer))
notogoniaeformis (*liriformis* Pulawski)
palopterus (*camptopygus*, *ptah*)
panzeri (*aemulus*, *bostryx*, *caliban*, *calidus*, *cheops*, *chephren*, *conclusus* Nurse, *dolosus*, *georgii*, *gracilicornis*, *lucillus* Pulawski, *pseudopanzeri* de Beaumont, *rubicundus* Pulawski, *socotrae*, *sycorax*, *taita*)
pisonoides Reed (*reedi* Menke)
pompiliformis (Panzer) (*angelicus* Pulawski, *antennatus* W. Fox, *aterrimus*, *crassiformis* Viereck, *crassipes*, *erythrophorus*, *ferrugineus* Pulawski, *morawitzi* Pulawski, *pinal* Pulawski)
punctatiformis (*montanus* (Cresson), *punctifrons* (W. Fox))
similis Rohwer (*alpestris* Rohwer)
speciosissimus (*hostilis*, *samburu*)
subdentatus F. Morawitz (*pauxillus* W. Fox)
tarsatus (Say) (*irregularis* Pulawski, *powelli* Bohart)
terminatus (F. Smith) (*linsleyi* Bohart)
undatus (F. Smith) (*advenus*) Pulawski
vestitus (*incanus*)

The data were analysed using the Nona program by Pablo Goloboff, with *h/1* and *nixwts 100 70* commands, developed to deal with large data sets (one initial tree retained, with 70 replications, each with 100 iterations). The program converted characters 40, 41, and 45 to nonadditive, and character 40 in *tarsatus* to a range. It generated 49 shortest, equally parsimonious trees, each with 522 steps, consistency index of 18, and retention index of 75. The strict consensus tree, with 946 steps, consistency index of 9, and retention index of 51, is represented in Fig. 3 (see pp. 28–30).

FIGURE 3. Cladogram of *Tachysphex* (strict consensus tree).

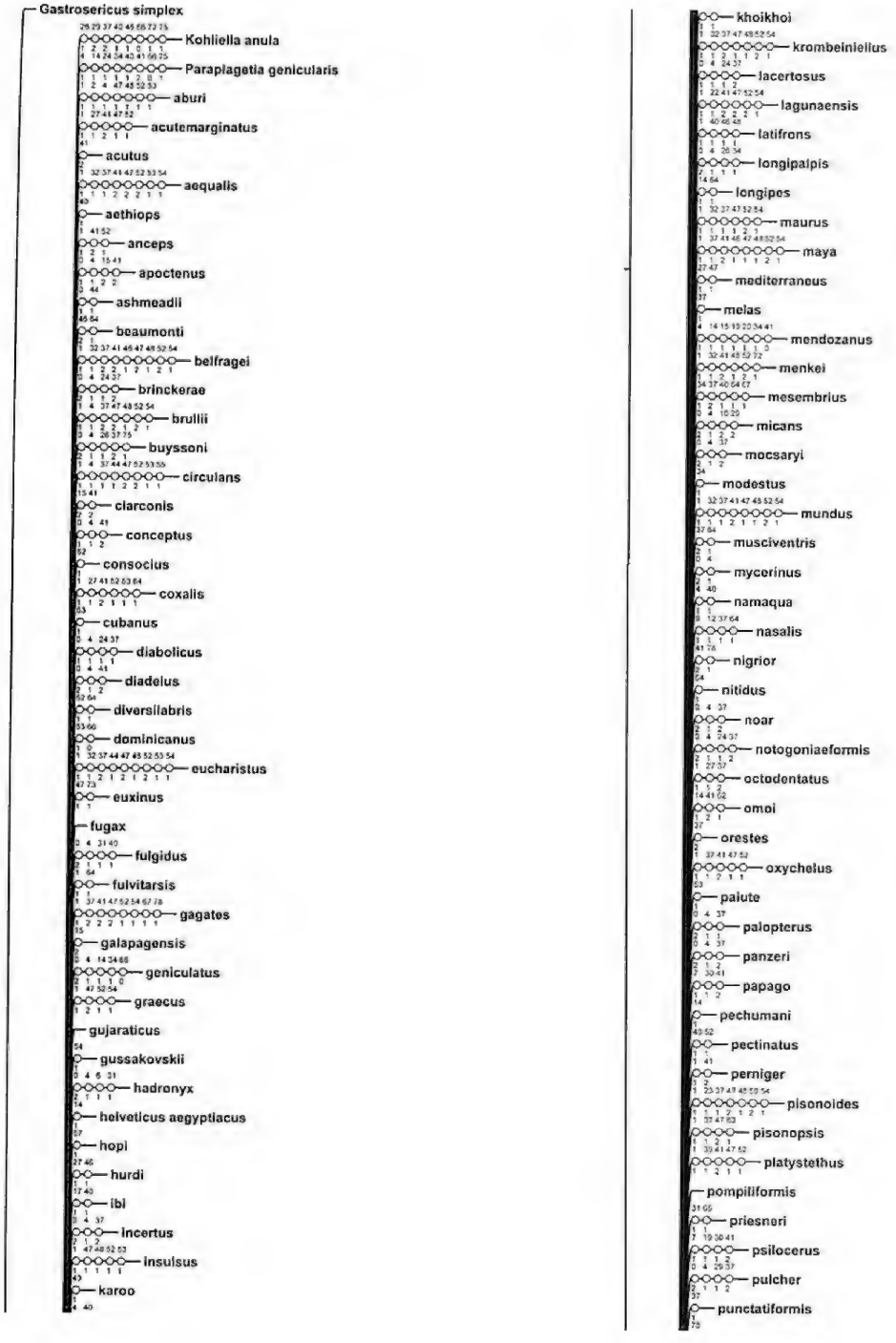


FIGURE 3 (continued). Cladogram of *Tachysphex* (strict consensus tree).

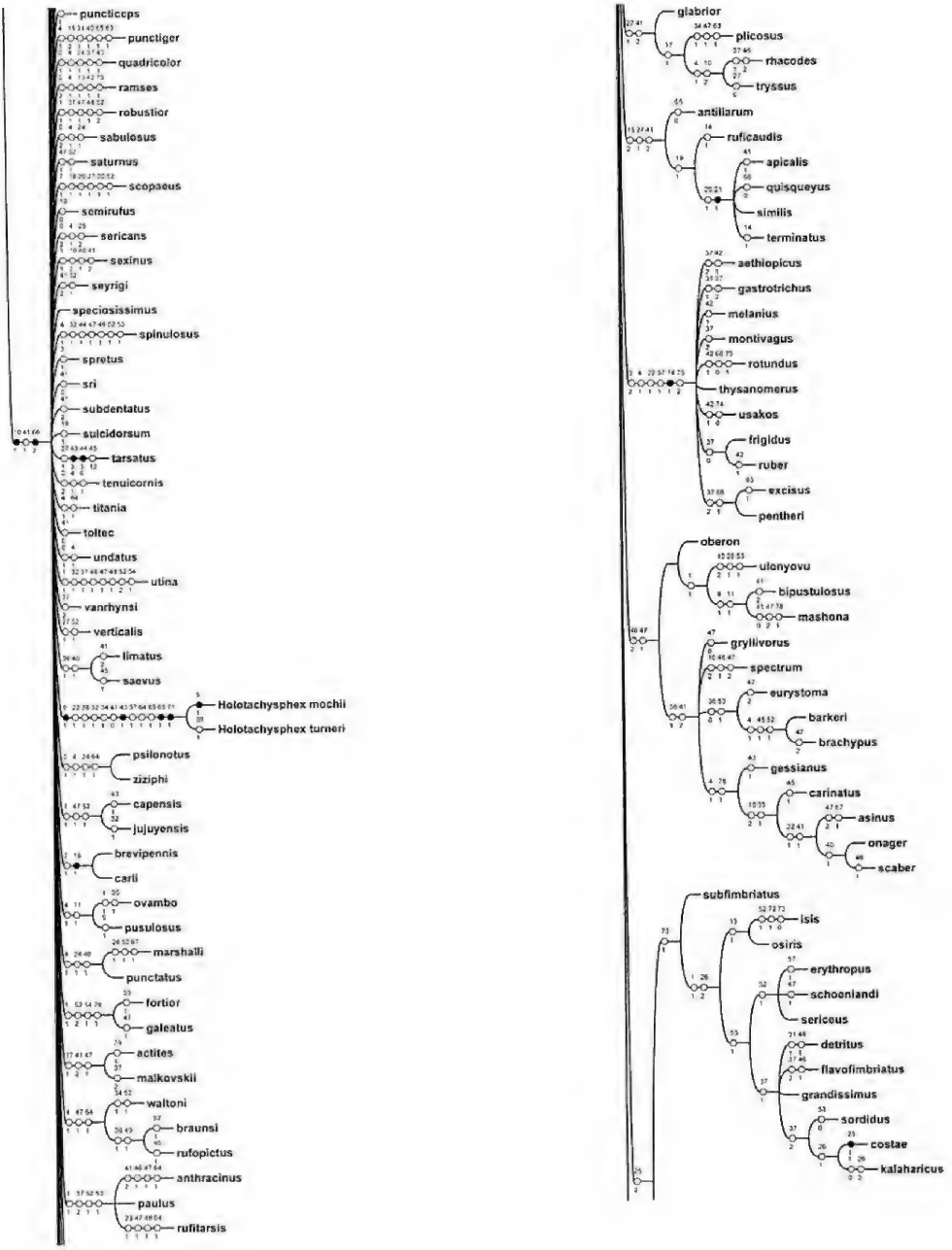
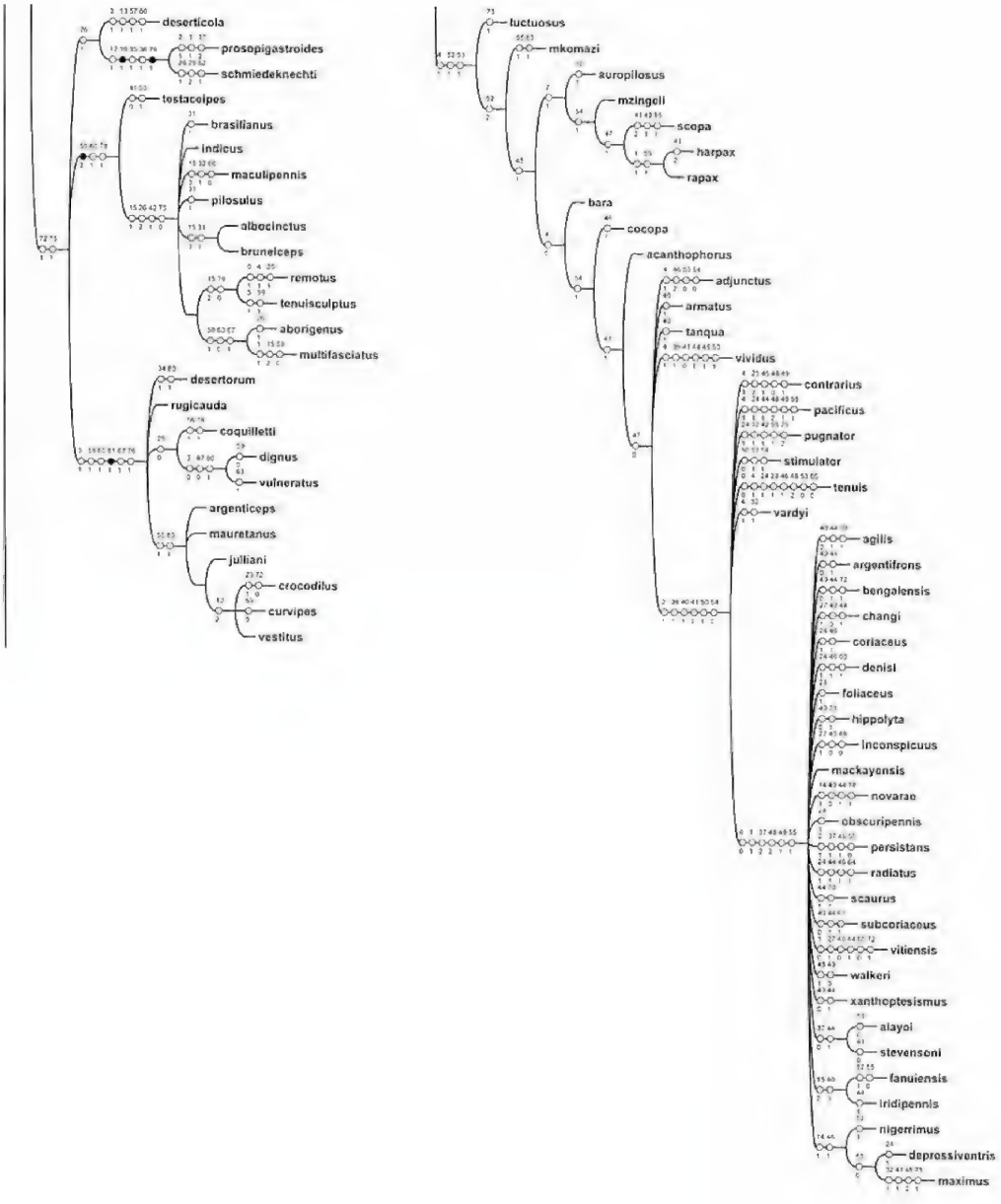


FIGURE 3 (continued). Cladogram of *Tachysphex* (strict consensus tree).



As can be expected when 258 terminals are analyzed with only 81 characters, the resulting conensus tree is largely unresolved. The following, however, are among most significant results:

Tachysphex is not monophyletic. This is because the genus has not a single autapomorphy (or such an autapomorphy is currently unknown), as discussed under the Generic Diagnosis above.

A number of species are not assigned to any lineage.

Of the 18 species groups discussed above, the following are recognized: the *albocinctus*, *asinus*, *brevipennis*, *erythropus* (with inclusion of *isis* and *kalaharicus*), *geniculatus* (represented on the cladogram by *geniculatus* alone), *julliani* (with the exclusion of *deserticola*), *pentheri*, *schmiedeknechti*, and *terminatus* (with the exclusion of *clarconis* and *galapagensis*) groups. Not recognized are the *panzeri*, *plicosus*, *pompiliformis*, and the *undatus* groups. The *brullii* group is not recognized except for the *obscuripennis* subgroup.

The *albocinctus*, *julliani*, and *schmiedeknechti* species groups form together a larger, monophyletic lineage.

Correlations between stucture and function.— At least nine structural characters of *Tachysphex* can be correlated with a specific function, and namely:

1. a convex labrum, protruding from beneath the clypeus, apparently is an adaptation to protect the elongate mouthparts, which in turn are an adaptation to visit flowers with deep corollae.
2. a flattened scutum and scutellum in the females of the *obscuripennis* subgroup (the flattening reaching its maximum in the Australian *depressiventris* R. Turner and *foliaceus* Pulawski) apparently is an adaptation for hunting cockroaches, helping the female penetrate narrow crevices where their prey live.
3. the abbreviated middle tarsomeres in the females of the *asinus* group apparently are an adaptation for catching or carrying the gryllid prey.
4. similarly, the modified preapical and apical tarsomeres of the *obscuripennis* subgroup are an adaptation for either catching or carrying the blattid prey.
5. the apically broadened foretarsomeres I and II apparently facilitate digging burrows. This feature has developed independently at least three times: in the *albocinctus* group, in *aethiopicus* and its relatives, and in the Australian *pugnator*.
6. the increase in size of the hindwing jugal lobe (and the resulting shift of vein cu-a from vertical to oblique) in the *albocinctus, erythropus*, and *isis* species groups apparently adds to the flight velocity. Judging by my field observations, members of these groups fly more rapidly than the other *Tachysphex*.
7. the dense, reflective setae that reach their maximum development in *deserticola, isis, luxuriosus, osiris*, and *vestitus*, clearly protect the body against intense solar radiation in the desert habitat where these species occur.
8. the highly shiny integument (as in *gagates*) reflects the solar radiation, again in the desert habitats.
9. the long, erect setae of *hadronyx* and *tenuicornis* clearly protect the body against cold oceanic winds of the Namib Desert.

Geographic distribution of African *Tachysphex*.— *Tachysphex* is a cosmopolitan genus, and individual ranges vary greatly. Some species are known from a single locality or a few localities, whereas others extend over three continents and three zoogeographic regions. Although no two species heave exactly identical ranges, most of them can be arranged into similar groups. Among the African species, I have recognized the following distribution types:

1. Africa to at least Central Asia or India, extending to Europe in most cases: *albocinctus*, *brevipennis*, *consocius*, *costae*, *detritus*, *fugax*, *fulvitarsis*, *mediterraneus*, *plicosus*, *sericeus*, *vulneratus*.
2. North Africa, southern Europe, east to at least Central Asia: *erythropus* (south to Tanzania), *incertus*, *julliani*, *mocsaryi*, *nitidior* (south to Kenya), *nitidissimus*, *nitidus* (north to northern Europe), *panzeri*, *tarsinus*.
3. Sahara to Central Asia or India: *argentatus*, *buyssoni* (east to Iraq only), *cheops*, *crocodilus* (Lower Egypt to Turkmenistan), *desertorum*, *erythrophorus* (also Benin and Togo), *grandissimus*, *gujaraticus*, *longipalpis*, *micans*, *priesneri*, *schmiedeknechti* (south to Kenya), *speciosissimus*.

4. Sahara: *deserticola*, *gracilicornis* (also Israel), *gracilitarsis*, *helveticus aegyptiacus*, *incanus*, *luxuriosus* (also Israel), *osiris*, *pseudofasciatus* (also Israel), *sulcidorsum*, *yarrowi* (also Israel).
5. Sahara and Arabian Peninsula: *geniculatus*, *horus*, *inextricabilis*, *isis*, *mycerinus*, *palopterus*, *ptah* (Lower Egypt to Yemen), *vestitus*.
6. Arabian Peninsula to Central Asia: *curvipes* (Sinai to Turkmenistan), *dignus*, *pulcher*, *sordidus*.
7. Lower Egypt: *anubis*, *chephren* (also Israel), *fasciatus*, *ramses*.
8. West Africa: *aburi*, *coxalis*, *excavatus*, *rugosipleuris*, *sahelensis*, *theseus*.
9. Sub-Saharan Africa: *aethiopicus*, *argenticeps* (also Oman), *bruneiceps* (also Madagascar), *calidus* (also Sahara), *dolosus*, *harpax* (also Israel and Syria), *modestus*, *oberon*, *pentheri* (also Arabian Peninsula), *quadricolor*, *saturnus* (also Madagascar), *silvestris* (south to Tanzania), *suavis* (also Madagascar).
10. East Africa (southern Ethiopia to Tanzania): *auropilosus*, *bostryx*, *erythrurus*, *iaphetes*, *mkomazi*, *omoi*, *rapax*, *samburu*, *spectrum*, *taita* (also Namibia).
11. Southern Africa (South Africa to Zambia): *ambiguus* (north to Zaire), *angustus* (north to Tanzania), *asinus* (north to Tanzania), *aterrimus*, *barkeri*, *bipustulosus* (north to Tanzania), *brachypus*, *brinckerae*, *caliban*, *claripes*, *crassipes*, *diabolicus*, *dissimulatus*, *gagates* (north to Kenya), *georgii* (north to Kenya and Uganda), *hippolyta* (north to Kenya), *kalaharicus*, *lacertosus*, *marshalli*, *mashona*, *melanius*, *miniatulus*, *mzingeli* (north to Tanzania), *octodentatus*, *paulus*, *prosopigastroides*, *punctatiformis*, *punctatus*, *rhodesianus*, *rotundus*, *ruber*, *sabulosus*, *saevus*, *scaber*, *schoenlandi*, *scopa*, *stevensoni*, *sycorax*, *titania*, *tryssus*, *ulonyovu*.
12. Namib Desert: *frigidus*, *gastrotrichus*, *longipes*, *tenuicornis*, *thysanomerus*, *ulothrix*, *usakos*.
13. Namibia, western South Africa: *hadronyx*, *punctiger*, *ziziphi*.
14. South Africa: *argentifrons*, *braunsi*, *diversilabris*, *fulgidus*, *gessianus*, *ibi*, *karoo*, *limatus* (also southern Namibia), *luctuosus*, *mesembrius*, *montivagus*, *namaqua*, *psilonotus*, *rufopictus*, *waltoni* (also Namibia), *subfimbriatus* (also Namibia), *ziziphi* (also Namibia).
15. Western South Africa: *capensis*, *erectus*, *khoikhoi*, *tanqua*, *vanrhynsi*.
16. Eastern South Africa: *agilis*, *eurystoma*, *montivagus*, *tembe*.
17. Madagascar: *ambositrae*, *ampijoroa*, *anceps*, *bara*, *cavatus*, *excisus*, *flavofimbriatus*, *insulsus*, *merina*, *perniger*, *platystethus*, *scaurus* (also Aldabra), *sexinus*, *seyrigi*, *subcoriaceus*.
18. Abd-el-Kuri, Socotra: *glaber*, *socotrae*.

A number of species do not fit any of the above categories. They are: *aemulus* (Tanzania to Israel and Jordan), *agnus* (southern Spain, Morocco to Tunisia, Sinai and Israel, Turkey, Arabian Peninsula, Socotra), *asmara* (Eritrea, Ethiopia), *atlanteus* (Morocco, Tunisia), *aureorufoniger* (Tanzania, Zambia), *bemba* (Zambia, Namibia, northern Zimbabwe), *brevipecten* (Morocco to Libya and Jordan), *camptopygus* (Namibia outside Namib Desert), *carinatus* (Tanzania, Zimbabwe), *clypeatus* (Zaire, Zambia, northern Namibia), *congoensis* (Zaire), *ebeninus* (Zimbabwe), *hermia* (Namibia, Zimbabwe), *lindbergi* (Cape Verde Islands, Madeira), *mauretanus* (Morocco, Algeria), *niloticus* (Egypt, Kenya, Tanzania), *notogoniaeformis* (Morocco to Libya), *onager* (Tanzania, Malawi), *ovambo* (Angola), *pusulosus* (Morocco, Libya, Israel, northern Turkey), *rhacodes* (Ethiopia to Zimbabwe and Namibia), *venator* (Zambia), *zambius* (Zambia, Malawi).

The species concentration in individual areas in Africa is quite uneven (Fig. 4). Although many differences in the species number result from inadequate collecting, it is clear that the highest number of species is in South Africa, Namibia, and Zimbabwe, followed by Egypt and Kenya-Tanzania area. The southern Africa, with its 70 species, significantly exceeds any other area in the world. For example, the highest species richness in North America is in California-Nevada, where 50 species occur.

Geological events that affected evolution of African *Tachysphex*.— In the absence of any fossil evidence, we can only speculate about the age of *Tachysphex*. The following geological events, however, must have significantly affected the evolution of African *Tachysphex*:

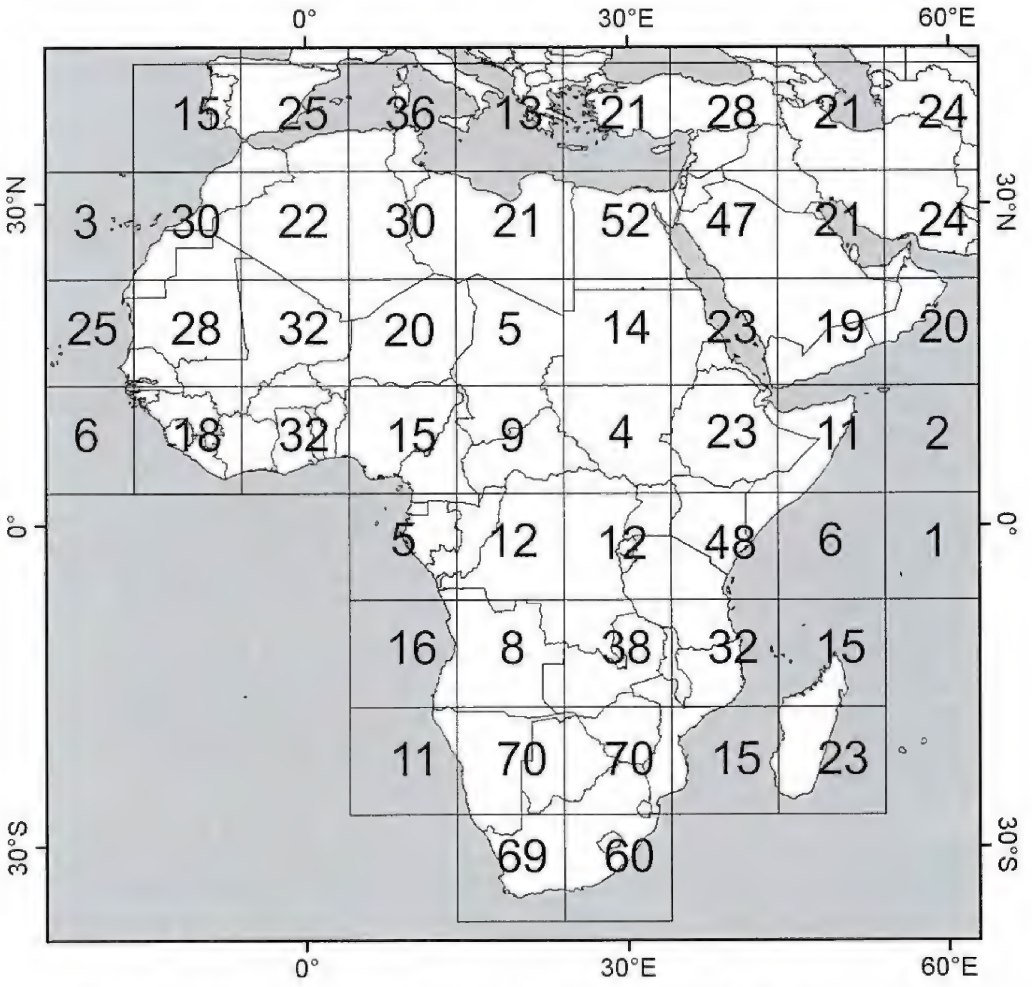


FIGURE 4. Number of species of *Tachysphex* in squares of 10 degrees of latitude and longitude.

1. **Separation of Madagascar**. Madagascar, with the Indian subcontinent still attached to it eastern margin, separated from the African mainland in the Later Jurassic, some 165 my B.P., moved south-southeastward relative to the African coast and came to rest some 400 km E of Mozambique approximately 130–125 my B.P., well before the beginning of the Late Cretaceous; the Indian subcontinent and Seychelles detached some 88 my B.P. (Krause, 2003). It is not certain that *Tachysphex* existed before the split from Africa, as the earliest record of Crabronidae is from Lower Cretaceous of England (*Iwestia provecta* Rasnitsyn and Jarzembowski, 1998, an extinct species and genus attributed to Pemphredoninae). Rather, they colonized Madagascar by oversea dispersal at a later time. Most have evolved into endemic species or radiated *in situ*.
2. **Slow northward movement of the African plate during the late Mesozoic and Cenozoic** that resulted in the shift of much of North Africa from wet equatorial into dry tropical latitudes, and much of southern Africa into dry tropical latitudes as well (Africa was 15–18 degrees farther south in Late Cretaceous-Paleocene; southern Africa may have supported temperate rainforest: Axelrod and Raven, 1978).
3. **Closure of the Tethys Sea** that took place 17–18 my B.P., in middle Miocene, allowed migration from Asia to Africa and ended long-persistent latitudinal circulation system that had brought warm moist climate into the Mediterranean and southern Asian regions.

4. **Desertification of Namib**. The arid condition prevailed in the Namib Desert as early as Late Cretaceous (Ward, Seely, and Lancaster, 1983). Weak upwelling of the cool coastal waters, associated with the development of the Benguela current, began as early as the Middle or Late Oligocene. Upwelling was greatly intensified during the late Miocene (Siesser, 1978). Maximum aridity was attained during the Pleistocene, with the establishment of the present Namib sand sea, and it is likely that the marked aridification of the Kalahari and the northwestern Cape Province of South Africa was a contemporary phenomenon, although no well-dated sequences are available to confirm it (Partrige, Wood, and deMenocal, 1995).
5. **Desertification of Sahara**. This took place in several steps (Williams et al., 1998):
   a. the northward movement of the African plate mentioned above.
   b. built up of polar ice caps (on Antarctica 10 my B.P, in Northern Hemisphere towards 2.5 my B.P) resulted in steepening the temperature and pressure gradient between the equator and the poles, which in turn resulted in increased Trade Winds velocities. Faster Trade Winds were better able to mobilize the alluvial sands of increasingly dry Sahara and to fashion them into desert dunes.
   c. the Neogene uplift of the Tibetan plateau and the ensuing creation of the easterly jet stream which brought dry subsiding air to the incipient deserts of Pakistan, Arabia, Somalia, Ethiopia, and Sahara.
   d. from about late Pliocene (3.7–1.7 my B.P.) onwards, the great tropical inland lakes in Sahara, Ethiopia, and Arabia began to dry out, and a network of major rivers became increasingly obliterated by wind-blown sands.
   e. during the ice-age, the sea level lowered, and the dessicating influence of the greater continentality was also enhenced. Stronger Trade Wingds accociated with steeper pressure gradient between the equator and the poles caused increased upwelling of cold waters offshore, further accentuanting the aridity of costal deserts. During the last glacial maximum (18 ky B.P.), the effective range of Sahara extended 400 to 600 km further south.
   f. in early Holocene (9–6 ky B.P.), Sahara became verdant. As postglacial temperatures and sea level rose around the world, summer monsoons once more became reliable sources of seasonal rainfall. Groundwater levels rose, aquifers were replenished, lakes refilled, mobile dunes became vegetated and stable, and savanna woodlands and grasslands reoccupied their previous areas, and a remarquable and well-integrated drainage network became established in many parts of Sahara, Arabia, and Rajasthan.
   g. in late Holocene (after 6 ky B.P.), Sahara dried out again to its present condition.

LIFE HISTORY.— Life history of *Tachysphex*, reviewed in detail in Pulawski, 1988, is not repeated here. In Africa, habits are unknown but for the following 11 species: *albocinctus*, *consocius*, *costae*, *fugax*, *fulvitarsis*, *mediterraneus*, *nitidus*, *plicosus*, *rhacodes*, *schmiedeknechti*, and *tarsinus*. Most of the relevant observations, however, have been conducted outside Africa. Information on prey is available for an additional 18 species: *anceps*, *asinus*, *brevipennis*, *dolosus*, *erythrophorus*, *excisus*, *georgii*, *gracilicornis*, *insulsus*, *julliani*, *montivagus*, *oberon*, *pentheri*, *perniger*, *schoenlandi*, *suavis*, *titania* and *vanrhynsi*. Nothing is known on the vast majority of species.

Keys to Species

The characters used in the keys require fresh material with well-preserved pilosity. Specimens may be misdetermined if the erect setae become appressed due to moisture.

Malagasy, Comoro, and Seychelle species

Unknown and not included: the male of *merina*.
Unknown but tentatively included: the female of *cavatus* and the male of *ambositrae*

1. Gaster all or partly red 2
   Gaster all black 5
2. Labrum convex, protruding beyond clypeal free margin (Fig. 141a); mesopleuron uniformly microareolate (Fig. 141c); male sterna V and VI each with conspicuous fimbrial fringe (Figs. 141d–f) . . . . . *excisus* Arnold, p. 278
   Labrum flat, not protruding or barely protruding beyond clypeal free margin; mesopleuron finely punctate to punctatorugose; male sterna without fimbrial fringes 3
3. Mesopleuron punctatorugose; setae of postocellar area erect. Female: width of postocellar area 2.0 × length; forefemoral venter impunctate and glabrous except for a few setigerous punctures (Fig. 20c) . . . . . *ambositrae* Leclercq, p. 104
   Mesopleuron finely sculptured; setae of postocellar area appressed. Female: width of postocellar area no more than 1.2 × length; forefemoral venter with evenly distributed, evanescent punctures that are close to each other 4
4. Propodeal dorsum rugose (rugae evanescent in some males), with setae inclined posterad. Female: pygidial plate punctatorugose (Fig. 50d). Male: sterna IV–VI with erect setae that are slightly more than one midocellar diameter long . . . . . *bara* Pulawski, sp. nov., p. 139
   Propodeal dorsum evenly microareolate, with setae (all or most) inclined obliquely anterad. Female: pygidial plate in most specimens punctate, with unsculptured interspaces, but exceptionally punctatorugose. Male: sterna with appressed setae. . . . . *insulsus* Arnold, p. 358
5. Tergum I, on basal declivity, with suberect, sinuous setae; foretarsomere I somewhat expanded apicolaterally in female and most males (as in Figs. 15c, d). Female: pygidial plate uniformly granulose except for superficial, sparse punctures (as in Fig. 15e) . . . . . *bruneiceps* Arnold, p. 171
   Tergum I with appressed, straight, inconspicuous setae; foretarsomere I not expanded apicolaterally. Female: pygidial plate not granulose 6
6. Hindwing crossvein cu-a with anal end further away from wing base than cubital end (as in Fig. 102a); sternum I with apical depression that is bisected by longitudinal carina (as in Fig. 132a). Female: clypeal bevel step-like. Male: forefemur not emarginate, sterna III and IV with conspicuous, dense setae on apical depressions . . . . . *flavofimbriatus* Arnold, p. 283
   Hindwing crossvein cu-a vertical or anal end closer to wing base than cubital end; sternum I in most specimens without longitudinal carina. Female: clypeal bevel flat or evenly convex. Male: forefemur emarginate basally, sterna without conspicuous setae on apical depressions 7
7. Male: scutal flange becoming unusually thickened and raised above scutal plane toward posterior end, apically protruding over scutal hindmargin (Fig. 89b); scutellar lateral area and axillar posterolateral surface conspicuously, deeply sunken (Fig. 89c); scutum with short, longitudinal ridges next to hindmargin (Figs. 89b, c). Female unknown, probably with identical characteristics . . . . . *cavatus* Pulawski, sp. nov., p. 192
   Scutal flange, axilla, and scutellum unmodified; scutum without longitudinal ridges 8

8. Female: forefemoral venter, midtrochanteral venter, and midfemoral posteroventral face with large punctures that are several to many diameters apart; tarsomeres IV as long as wide, with apicoventral margin concave; apical tarsomeres with one or a few preapical spines on venter; setae of propodeal dorsum oriented posterad. Male unknown, probably with fore- and/or midfemoral venter sparsely punctate . . . . . *merina* Pulawski, sp. nov., p. 687
   Female: at least midfemoral posterior face with fine, dense punctures except similar in *scaurus* and *suavis* in which tarsomeres IV are wider than long, with apicoventral margin obtusely prominent; either apical tarsomeres without preapical spines or setae of propodeal dorsum oriented anterad. Male: femora densely punctate except in *scaurus* 9
9. Venter of apical tarsomeres without spines or (*seyrigi*, some *perniger*) with one small, preapical spine; most or all setae of propodeal dorsum pointing anterad. Female: apicoventral margin of tarsomeres IV concave or straight; apical tarsomeres not angulate basoventrally, lateral margin without spines; claws equal in size in each pair 10
   Venter of apical tarsomeres with small spines (spines difficult to see in males of *suavis* in which most setae of propodeal dorsum are pointing posterad). Female: apicoventral margin of tarsomeres IV convex (e.g., Fig. 338d); apical tarsomeres angulate basoventrally, lateral margin with spines (e.g., Fig. 338c); on each leg one claw smaller than other. 17
10. Setae sinuous at least on mesopleuron and propodeal dorsum. 11
    Setae straight or curved, not sinuous, on mesopleuron and propodeal dorsum 12
11. Propodeal dorsum with conspicuous ridges that are diverging posterad on basal quarter to half and transverse on remaining surface (Fig. 282c). Female: thorax conspicuously, unusually flattened in profile; scutum flat; clypeal lip not incised laterally; lateral carinae of pygidial plate nearly parallel to each other, present only apically. Male: clypeal lip nearly reduced laterally, with well-defined corner (Fig. 282b); sternum VIII simple apically . . . . . *platystethus* Pulawski, sp. nov., p. 493
    Propodeal dorsum with only fine, transverse ridges. Female: thorax not flattened, scutum convex (the usual shape); clypeal lip with two lateral incisions on each side; lateral carinae of pygidial plate diverging anterad, present on most of tergum length. Male: clypeal lip pointed, without corner; sternum VIII tridentate apically. . . . . *ampijoroa* Pulawski, sp. nov., p. 688
12. Scutum: notaulus conspicuous (at least from certain angles), hindcorner prominent (Fig. 334a) . . . . . *saturnus* Arnold, p. 557
    Scutum: notaulus inconspicuous, hindcorner not prominent or slightly prominent 13
13. Setae of postocellar area longer than midocellar diameter (conspicuously so in most females). Female: clypeal lip not incised laterally (Figs. 149a, c); tergum V microsculptured (except on apical depression); apicoventral margin of tarsomeres V minimally concave. Male: clypeal lobe with prominent corner, distance between corners more than clypeal midlength (Figs. 149b, d); sterna IV–VI evenly sculptured (with minute, ill-defined punctures, interspaces microsculptured); outer margin of forebasitarsus in most specimens with preapical spines (Fig. 149g) . . . . . *fugax* (Radoszkowski), p. 287
    Setae of postocellar area about as long as midocellar diameter. Female: clypeal lip with two lateral incisions on each side (e.g., Fig. 353a); tergum V unsculptured except for a few, sparse punctures anterad of apical depression; apicoventral margin of tarsomeres V arcuate. Male: clypeal lobe different; sterna IV–VI punctate apically, largely impunctate preapically; outer margin of forebasitarsus without preapical spines. 14
14. Frons uniformly punctate above antennal socket . . . . . *sexinus* Leclercq, p. 585
    Frons with usual glabrous swelling above antennal socket. 15
15. Clypeal lobe wider (Figs. 355a, b): distance between lip corners 2.0–2.1 × distance between cor-

ner and orbit in female and 1.1–1.2 in male. . . . . *seyrigi* Arnold, p. 587
Clypeal lobe narrower (Figs. 22a, b, 280a, b, 338a, 339a, 367a, b, and 369a, b): distance between lobe corners 1.5–1.6 × distance between corner and orbit in female, 0.7 in male of *perniger* (corners absent in male of *anceps*) 16

16. Female: terga I–III each with well-developed silvery setal fascia; foretibia evenly setose throughout. Male: clypeal lobe without angulate corner, its free margin forming single curved line with rest of clypeal margin (Fig. 22b); inner mandibular margin without tooth (Fig. 22b) . . . . . *anceps* Arnold, p. 105
Female: terga I–III with largely reduced, inconspicuous fasciae (fasciae present only laterally); foretibial outer surface, in some specimens, impunctate and asetose between spines. Male: clypeal lobe with corner (Fig. 280b); inner mandibular margin with tooth . . . . . *perniger* Arnold, p. 491

17. Female: forebasitarsus and foretarsomere II with 8–10 and 4–6 rake spines, respectively, apical three or four spines on both tarsomeres with contiguous sockets; outer margin of foretarsomere IV markedly shorter than inner margin. Male: lateral margin of apical tarsomeres expanded, with group of small spines subbasally (Figs. 339d, e) . . . . . *scaurus* Arnold, p. 564
Female: forebasitarsus with 5–7 rake spines, only apical two with contiguous sockets; foretarsomere II with no more than three spines, at most two apical spines with contiguous sockets; outer margin of foretarsomere IV slightly longer than inner margin (which is not reduced). Male: lateral margins of apical tarsomeres not expanded, without spines 18

18. Setae of propodeal dorsum all erect or slightly inclined posterad; scutal setae in most specimens erect, about one midocellar diameter long. Female: scutal punctures equal in size or nearly so; scutellum convex; propodeal dorsum slightly shorter than scutellum and postscutellum combined. Male: apical portion of tergum VII without lateral carina; clypeal lobe broader (distance between lip corners equal to distance between corner and orbit or greater). . . . . *subcoriaceus* Arnold, p. 607
Setae of propodeal dorsum inclined obliquely posterad except for basomedian setae that are pointing contrastingly anterad; scutal setae appressed. Female: scutal punctures of two sizes: smaller dense punctures interspersed with larger sparse punctures; scutellum flat; propodeal dorsum slightly longer than scutellum and postscutellum combined. Male: apical portion of tergum VII with lateral, obtuse carina (therefore with rudimentary pygidial plate); clypeal lobe narrower (distance between lip corners smaller than distance between corner and orbit) . . . . . *suavis* Arnold, p. 604

Saharan, Sub-Saharan and Arabian species

WARNING: A number of forms of uncertain status have not been included, and still unknown species are likely to be found. Determinations must therefore be carefully checked against diagnoses and descriptions of individual species.

♀♀

Unknown and not included: *erectus* (Namaqualand region of South Africa), *sahelensis* (Mali, Senegal), and *zambius* (Malawi, Zambia); unknown but tentatively included: *aureorufoniger* (Tanzania, Zambia).

1. Episternal sulcus absent; mesopleuron not concealed by vestiture (Fig. 65d) . . . . . *brevipennis* Mercet, p. 159
Episternal sulcus present, in some species concealed by vestiture 2

2. Tarsomeres IV each with dorsoapical margin very broadly emarginate, almost straight, apical

width greater than length (e.g., Fig. 357d), and apicoventral margin roundly prominent mesally (e.g., 357e); length of midtarsomere III more than twice apical width; tarsomeres V each with venter angulate basoventrally and apicoventral margin produced into lobe (e.g., Fig. 357f)); on each leg one claw smaller than other (e.g., Figs. 357d, f) 3

Tarsomeres IV each with dorsoapical margin roundly to acutely emarginate, and apicoventral margin straight or concave; apical width not greater than length or, if greater, then length of midtarsomere III less than twice apical width; tarsomeres V each with venter not angulate basally and apicoventral margin in most species not produced into lobe; claws in most species even in each pair. 11

3. Mesopleuron rugose . . . . . *rugosipleuris* Pulawski, sp. nov., p. 547

Mesopleuron punctate 4

4. Forebasitarsus with 5–7 rake spines; in most specimens only two apical spines with confluent sockets (three sockets confluent in some); mesopleural punctures minute, ill defined 5

Forebasitarsus with 8–11 rake spines, of which at least three apical ones have sockets confluent (or nearly so); mesopleural punctures well defined. 7

5. Scutal punctures of two sizes (denser small punctures interspersed with sparser large punctures); mesopleural punctures about as large as smaller scutal punctures; basomedian setae of propodeal dorsum inclined anterad; width of postocellar area 1.5–1.7 × length . . . . . *suavis* Arnold, p. 604

Scutal punctures of equal size or nearly so; mesopleural punctures markedly finer than those on scutum; setae of propodeal dorsum all erect or inclined posterad; width of postocellar area 1.0–1.2 × length 6

6. Foretarsomere II with three rake spines, two apical spines with sockets confluent; mid- and hindtibiae largely red. Eastern South Africa . . . . . *agilis* (F. Smith), p. 88

Foretarsomere II with four rake spines, three apical spines with sockets confluent; tibiae black. West Africa to Tanzania. . . . . *silvestris* Pulawski, sp. nov., p. 589

7. Gastral segments V and VI red 8

Gaster all black. 9

8. Legs red; setae of propodeal dorsum all (or nearly all) oriented anterad. Southern Africa . . . . . *stevensoni* Arnold, p. 602

Femora and tibiae black or at most foretibial inner surface reddish; setae of propodeal dorsum erect or oriented posterad. West Africa . . . . . *theseus* Arnold, p. 629

9. Fore- and midfemora densely punctate and setose (at most a narrow zone on forefemoral venter sparsely setose); inner and outer margins of foretarsomere IV almost equal in length . . . . . *hippolyta* Arnold, p. 340

Fore- and midfemoral posteroventral surface with sparse setigerous punctures that are many diameters apart (Fig. 33e); outer margin of foretarsomere IV about 0.5 × length of inner margin. 10

10. Dorsal length of flagellomere I 1.4–1.6 × apical width (Fig. 33c), about 0.6 × length of II; clypeal lip with two lateral incisions on each side (Fig. 33a), although incisions may disappear in worn specimens; midtrochanteral venter punctate; apical depression of sternum I not bisected by carina. South Africa . . . . . *argentifrons* Arnold, p. 120

Dorsal length of flagellomere I about 2.25 × apical width, about 0.85 × length of II; clypeal lip shallowly, broadly emarginate laterally (Fig. 405); midtrochanteral venter impunctate; sternum I with longitudinal carina that bisects apical depression. Zambia . . . . *venator* Arnold, p. 648

11. Hindtarsomere IV: dorsoapical emargination rounded proximally (e.g., Fig. 179a); tarsomeres V and claws elongate (e.g., Figs. 179b, c), arolium less than half length of each adjacent claw

(e.g., Figs. 179b, c) except in some *harpax*; apicoventral margin of tarsomere V produced into lobe that can be round or acute (e.g., Fig. 179c) 12
Hindtarsomere IV: dorsoapical emargination angulate or nearly so; tarsomeres V and claws not elongate (slightly elongate in *iaphetes*), arolium in most species more than half length of each adjacent claw; apicoventral margin of tarsomere V varying from slightly concave to slightly convex 17

12. Fore- and midfemoral venters with a few large punctures and as many setae (punctures many diameters apart, setae not concealing integument). . . . . *tanqua* Pulawski, sp. nov., p. 620
Fore- and midfemora densely punctate and setose (punctures inconspicuous, largely hidden by vestiture). 13

13. Setae sinuous, conspicuously erect on gena, mesothorax, and fore- and midfemoral venters 14
Setae straight and appressed on head, mesothorax, and femora 15

14. Propodeal side not ridged; gaster black except reddish apically; middle clypeal lobe wider, with corners closer to adjacent orbit than to each other (Fig. 313a). Kenya, Tanzania . . . . . *rapax* Pulawski, sp. nov., p. 531
Propodeal side ridged; gaster all red, segments III–VI black in some specimens; middle clypeal lobe narrower, with corners about equidistant from each other and adjacent orbit (Fig. 346a). Angola, Namibia, South Africa . . . . . *scopa* Pulawski, sp. nov., p. 575

15. Hindtarsomere III shorter: length about 1.2 × apical width; frontal setae silvery, femora black; length 7.1–9.1 mm . . . . . *harpax* Arnold, p. 329
Hindtarsomere III longer: length about 1.5 × apical width; frontal setae golden, femora red (fore- and midfemora black basodorsally); length 13.0–14.5 mm 16

16. Middle clypeal section with sparsely punctate, subapical area (Fig. 48a); tergum V finely punctate throughout; wings uniformly yellow; apical tarsomeres with two or three spines on each lateral margin (Figs. 48d, g) . . . . . *auropilosus* R. Turner, p. 136
Middle clypeal section uniformly punctate (Fig. 247a); apical depression of tergum V impunctate and glabrous; wings yellow basally, distally brown with violet shimmer; apical tarsomeres with one or two spines on each lateral margin (Fig. 247d) . . . . . *mzingeli* Pulawski, sp. nov., p. 435

17. Forefemoral venter and posteroventral midfemoral surface impunctate and glabrous or with large punctures that are several to many diameters apart and a few associated setae (except forefemoral venter densely punctate apically in *ibi* and on apical half or third in *longipalpis*); and frons with glabrous swelling above each antennal socket, swellings not unusually expanded; punctures of pygidial plate averaging several to many diameters apart mesally; width of postocellar area no more than 1.4 × length 18
Fore- and midfemora uniformly, densely punctate, or venter with minute punctures that are many diameters apart, or large, sparse punctures present only basally (*desertorum*, *speciosissimus*), or forefemoral posteroventral surface, in distal half, with punctures that are several diameters apart; if forefemoral venter partly or all impunctate, then frons evenly punctate above antennal socket (*asinus*, *onager*, *scaber*), or supraantennal swelling unusually expanded (*mashona*, *pusulosus*), or pygidial plate punctatorugose or with punctures averaging about 1 diameter apart mesally (*asinus*, *onager*, *saevus*, *scaber*); if forefemoral venter sparsely punctures (*glaber*, some *punctatiformis*), then also with erect setae; width of postocellar area varying. 33

18. Setae sinuous, erect or suberect, on postocellar area, scutum, and mesopleuron, setal length markedly more than midocellar diameter 19

Setae straight, appressed on postocellar area and thorax, or if erect on postocellar area (*ibi, khoikhoi, namaqua*) then about as long as midocellar diameter or shorter 21

19. Propodeal side ridged; free margin of clypeal lobe with two lateral incisions on each side (Fig. 230c); labrum flat; setae of tergum I appressed or nearly so, no longer than midocellar diameter; tibiae black . . . . . *mesembrius* Pulawski, sp. nov., p. 412
Propodeal side punctate; free margin of clypeal lobe without lateral incisions (Figs. 153a, 303a); labrum slightly (*punctiger*) to markedly (*fulgidus*) convex; setae of tergum I erect on basal declivity, longer than midocellar diameter; tibiae red 20
20. Propodeal dorsum longitudinally ridged, dull; galea practically unsculptured in about basal two thirds, contrastingly densely micropunctate in apical third, with punctures practically contiguous (Fig. 153c); gaster red basally; terga not fasciate . . . . . *fulgidus* Arnold, p. 297
Propodeal dorsum punctate, with shiny, unsculptured interspaces (Fig. 303c); galea with a few, minute punctures; gaster black; terga I–III or I–IV silvery fasciate apically . . . . . *punctiger* Pulawski, sp. nov., p. 520
21. Clypeal lobe unusually wide (Fig. 206c), distance between lip corners about 1.8 × clypeal midlength; gaster, femora, and tibiae all black; labrum flat . . *khoikhoi* Pulawski, sp. nov., p. 375
Clypeal lobe narrower, distance between lip corners in most species 0.9–1.3 × clypeal midlength, but 1.4–1.5 in some (in which gaster and legs are all or partly red and/or labrum is convex) 22
22. Gena adjacent to orbit unsculptured or with a few, sparse punctures . . *limatus* Arnold, p. 380
Gena minutely, densely punctate (interspaces about equal to punctures) 23
23. Setae of postocellar area erect, about as long as midocellar diameter; propodeal dorsum finely, irregularly rugose or ridged; propodeal side ridged; gaster black, wing membrane moderately infumate . . . . . *ibi* Pulawski, sp. nov., p. 347
Setae of postocellar area appressed except in *namaqua* in which gaster is red basally; propodeal dorsum uniformly microareolate except in many *marshalli* in which wings are black with violet shimmer; propodeal side ridged, finely punctate, or uniformly microsculptured 24
24. Thoracic vestiture dark brown; propodeal dorsum all or partly ridged or rugose and labrum flat, emarginate mesally; wings moderately infumate . . . . . *capensis* (de Saussure), p. 187
Thoracic vestiture silvery (dark in many *marshalli*); propodeal dorsum uniformly microareolate (irregularly ridged in many *marshalli* in which labrum is markedly convex apically, not emarginate mesally, and wings are black with violet shimmer) 25
25. Wing membrane hyaline to moderately infumate; mesopleuron uniformly microsculptured or with punctures that are several to many diameters apart near center; propodeal side unridged at least mesally 26
Wing membrane black or nearly so, bicolored in some *quadricolor* (yellowish with infumate apical band); mesopleuron slightly rugose to uniformly microsculptured; propodeal side ridged (ridges evanescent in some specimens) 31
26. Gaster red at least basally 27
Gaster all black 29
27. Labrum conspicuously convex, markedly protruding from beneath clypeus (Fig. 214a); mesopleuron uniformly microsculptured; dorsal length of flagellomere I 3.2–3.4 × apical width. Libya to Turkmenistan . . . . . *longipalpis* de Beaumont, p. 385
Labrum flat or minimally convex apically, not protruding or slightly protruding from beneath clypeus; mesopleuron punctate at least beneath scrobe; length of flagellomere I no more than 2.0 × apical width. South of equator 28
28. Setae of postocellar area appressed; femora black; length of flagellomere VIII 1.5 × maximum

width ..... *rufopictus* Arnold, p. 544
Setae of postocellar area erect, about as long as midocellar diameter; femora red; length of flagellomere VIII 2.0 × maximum width ..... *namaqua* Pulawski, sp. nov., p. 437

29. Tibiae red; length of flagellomere VIII 1.2 × maximum width ..... *braunsi* Arnold, p. 154
Tibiae black; length of flagellomere VIII about 1.5 × maximum width 30

30. Flagellomeres III–VIII with well-defined sensory areas (as in Figs. 38c–e) .....
..... *gessianus* Pulawski, sp. nov., p. 312
Flagellomere III without sensory area, following flagellomeres with ill-defined sensory areas
..... *karoo* Pulawski, sp. nov., p. 374

31. Mesopleural setae erect; forebasitarsus along outer margin concave, unsculptured and glabrous, at least in basal two thirds ..... *marshalli* R. Turner, p. 395
Mesopleural setae appressed; forebasitarsus along outer margin flat, setose 32

32. Clypeal lip markedly arcuate (Fig. 308a); gaster red or tergum IV black, tibiae red; scutal punctures fine, uniform, no more than one diameter apart ..... *quadricolor* (Gerstaecker), p. 524
Clypeal lip only slightly arcuate (Fig. 301a); gaster and tibiae black or terga I–V with ill-defined preapical reddish zones; scutal punctures of medium size, many discal punctures in most specimens two or more diameters apart ..... *punctatus* (F. Smith), p. 518

33. Pygidial plate uniformly granulose except for superficial, sparse punctures (Figs. 15e, f); hindwing crossvein cu-a with anal end further away from wing base than cubital end (as in Fig. 102a); foretarsomere I somewhat expanded apicolaterally (Fig. 15c) 34
Pygidial plate impunctate, punctate, or punctatorugose; orientation of hindwing crossvein cu-a and shape of foretarsomere I varying but not in above combination 35

34. Postocellar area narrow (Fig. 14a), its width 0.6–1.0 × length; scutal punctures no more than one diameter apart (Fig. 15a); forebasitarsus with 11–13 rake spines .....
..... *albocinctus* (Lucas), p. 92
Postocellar area wide (Fig. 70a), its width 1.7–2.0 × length; discal punctures of scutum several to many diameters apart (Fig. 71a); forebasitarsus with seven or eight rake spines.....
..... *bruneiceps* Arnold, p. 171

35. Scutum coarsely punctatorugose or areolate (Fig. 342c), scutal integument not concealed by vestiture; supraantennal swelling in profile triangularly prominent (Fig. 289c); clypeal free margin without median tooth; hindcoxal dorsum not expanded into tooth; tibiae black; flagellomeres III–X flattened laterally, with well-defined ventral edge (Figs. 290a–c)..... 36
Scutum punctate (punctures ill defined in some species), microsculptured in some species (in which integument is concealed by vestiture), largely punctatorugose in some *mediterraneus* (in which clypeal free margin has an obtuse median tooth, supraantennal swelling is nonprominent, rounded in profile, and dorsal hindcoxal carina is expanded into tooth basally), and areolate in some *vulneratus* (in which tibiae are red); flagellomeres in cross-section round or nearly so 37

36. Clypeal free margin arcuate (Fig. 342a); inner hindtibial spur with widely spaced rays (Fig. 343b)..... *schmiedeknechti* Kohl, p. 568
Free margin of clypeal lip with median notch and three pairs of obtuse teeth (Fig. 289a); inner hindtibial spur with usual, closely spaced rays ..... *prosopigastroides* Bischoff, p. 502

37. Pygidial plate unusually broad (e.g., Fig. 200c) and/or longitudinally microridged in apical third or so, apex not incised; hindwing vein cu-a vertical or nearly so 38
Pygidial plate narrow or somewhat broadened but not microridged apically, apex incised or not incised; hindwing vein cu-a variously oriented..... 48

38. Pygidial plate somewhat constricted preapically (Figs. 409c, 410a); clypeal lip in vast majori-

ty of specimens with two pairs of lateral incisions (Fig. 409a); gaster all black or red apically ..... *vulneratus* R. Turner, p. 654

Pygidial plate not or inconspicuously constricted preapically; clypeal lip not incised laterally; gaster all red or black apically, all black in most *desertorum* 39

39. Free margin of clypeal lip with six obtuse but well-defined teeth (Figs. 29a, 30a), although two admedian teeth are confluent in some specimens; mesopleural punctures well defined, interspaces shiny. Sub-Saharan ..... *argenticeps* Arnold, p. 115

Free margin of clypeal lip arcuate, nearly straight, or with somewhat ill-defined, obtuse, median tooth; mesopleuron with ill-defined punctures or finely rugose, dull. Sahara and/or western Asia 40

40. Setae of maxillary stipes about 1.5–2.0 × midocellar diameter, concealing underlying integument; setae erect and sinuous adjacent to entire occipital carina, longest setae about 0.7 × basal mandibular width; scutal setae suberect anteriorly; maximum length of marginal cell (membrane only) 2.8 × maximum width (Fig. 107c). Egypt, Turkmenistan ..... *crocodilus* Pulawski, p. 230

Setae of maxillary stipes shorter, not concealing integument; genal setae not sinuous or sinuous only next to occipital carina, longest setae 0.4 × basal mandibular width or less; scutal setae all appressed; maximum length of marginal cell 3.5–4.0 maximum width 41

41. Pygidial plate sparsely punctate from base to apex; mandibular outer ridge not swollen and not expanded over notch; galea well sclerotized; propodeal posterior face with median sulcus that extends up to dorsal margin; apical tarsomeres each with a pair of small basoventral spines ..... *dignus* Kohl, p. 246

Pygidial plate sparsely punctate only basally or all impunctate; mandibular outer ridge somewhat swollen and expanded over notch; galea membranous; propodeal posterior face, near dorsal margin, with flat median impression; apical tarsomeres without basoventral spines or with one such spine 42

42. Mesopleural vestiture completely or largely concealing integument; hindfemoral outer surface with dense, reflective setae at least near ventral margin (Fig. 407a) 43

Mesopleural integument easily visible, not concealed by vestiture; hindfemoral outer surface with less dense, nonreflective setae 46

43. Frons swollen at about midheight (Figs. 406c, e); tergum I with dense, conspicuous vestiture that largely conceals integument; pygidial plate narrower (Fig. 407b); forewing longer in distal half (Fig. 408a) ..... *vestitus* Kohl, p. 650

Frons evenly convex; tergum I with usual setae that do not conceal integument; pygidial plate broader (Figs. 27c, 109c), forewing shorter (the usual shape) 44

44. Trimmal carina with inconspicuous, obtuse tooth (Fig. 109a); pygidial plate without transverse groove, all uniformly unsculptured ..... *curvipes* Pulawski, sp. nov., p. 232

Trimmal carina with usual tooth (Figs. 27a, 191a); pygidial plate with transverse groove and/or conspicuously microsculptured apically (Fig. 27c) 45

45. Free margin of clypel lip evenly arcuate to insignificantly, obtusely pointed mesally (Fig. 27a); trimmal carina with narrow cleft (Fig. 27a) ..... *argentatus* Gussakovskij, p. 112

Free margin of clypeal lip obtusely pointed mesally (Fig. 191a); trimmal carina with cleft broader (Fig. 191a) ..... *incanus* de Beaumont, p. 349

46. Mesothoracic venter sparsely punctate (punctures several to many diameters apart); trochanteral venters of all legs at most with a few, sparse punctures; forefemoral venter with large, sparse punctures in basal half or so; hindfemoral venter asetose except basally; tergum IV not fascate ..... *desertorum* F. Morawitz, p. 237

Mesothoracic venter uniformly densely punctate (punctures about one diameter apart); trochanteral venters and forefemur densely punctate; tergum IV silvery fasciate 47

47. Mandibular outer ridge swollen and expanded over notch. North Africa, southern Europe, east to Kazakhstan and Pakistan. ..... *julliani* Kohl, p. 364
Mandibular outer ridge not swollen, not expanded over notch. Morocco, Algeria. ..... *mauretanus* Pulawski, p. 402

48. Scutum longitudinally ridged at least in posterior half (Figs. 315e, 316c) ..... *rhacodes* Pulawski, sp. nov., p. 534
Scutum not ridged except ridged next to hindmargin in some specimens 49

49. Tarsi shortened (Fig. 39d): length of midtarsomere II 1.3–1.8 × apical width, 1.9 × apical width in *tembe*, that of midtarsomere III about equal to apical width except 1.1 × apical width in *tembe*, 1.2 × apical width in *ulonyovu*, and 1.3 × in *ovambo* and *spectrum*; middle flagellomeres in many specimens with sensory areas (Figs. 38c–e); pygidial plate emarginate or incised apically (Fig. 39a) 50
Tarsi not shortened: length of midtarsomere II more than twice apical width, that of midtarsomere III at least 1.3 × apical width; flagellum without sensory areas; pygidial plate either incised or rounded apically 64

50. Supraantennal swelling punctate almost like surrounding surface (as in Fig. 316a) and propodeal side ridged or coarsely rugose throughout 51
Supraantennal swelling shiny, impunctate except punctate in spectrum and some *ulonyovu* in which propodeal side is finely sculptured, at most with vestigial ridges 54

51. Sternum I with median carina that is conspicuously prominent apically (Fig. 88c); femora and tibiae black ..... *carinatus* Pulawski, sp. nov., p. 191
Sternum I not carinate; at least mid- and hindfemora red; tibiae red 52

52. Scutum with minute punctures that are no more than one diameter apart, and with larger punctures that are many diameters apart; clypeal bevel rudimentary or shorter than basomedian area (Fig. 38a) ..... *asinus* Arnold, p. 124
Scutal punctures different (see next couplet for details); clypeal bevel about as long as basomedian area 53

53. Scutal disk with small punctures (no larger than those on postocellar area) that are several diameters apart and with larger punctures that are many diameters apart; apical mid- and hindtarsomeres with subbasal spine or a pair of such spines . . . *onager* Pulawski, sp. nov., p. 463
Scutal punctures coarse, of equal size, slightly larger than those on postocellar impression; apical tarsomeres without subbasal spines ..... *scaber* Pulawski, sp. nov., p. 562

54. Labrum free margin obtusely pointed mesally (Fig. 54a) and femora and tibiae black; galea in profile longer than wide, with lateral surface concave in most specimens 55
Labrum free margin arcuate to emarginate mesally, obtusely pointed mesally in *saevus* in which femora and tibiae are red; galea in profile longer or shorter than wide, its lateral surface not concave 56

55. Clypeal lobe wider: distance between lip corners about 1.4–1.6 × distance between lip and adjacent orbit; propodeal side finely ridged; flagellum thicker, e.g., length of flagellomere III 1.3–1.4 × apical width; flagellomeres with well-defined sensory areas ..... *barkeri* Arnold, p. 142
Clypeal lip narrower: distance between lip corners about 1.1 × distance between corner and adjacent orbit; propodeal side not ridged; flagellum thinner, e.g., length of flagellomere III 1.7–8 × apical width; flagellomeres with ill-defined sensory areas ..... *brachypus* Pulawski, sp. nov., p. 152

56. Gaster red basally . . . . . *ulonyovu* Pulawski, sp. nov., p. 639
Gaster all black or at most with a pair of red spots (some *mashona*) 57
57. Both clypeal free margin and labrum free margin obtusely pointed mesally (Fig. 327a); ventral midfemoral margin evenly convex except contrastingly concave preapically (Fig. 327c); femora and tibiae red. . . . . *saevus* Arnold, p. 551
Free margin of clypeal lip arcuate to shallowly emarginate, that of labrum mesally straight to emarginate; ventral midfemoral margin evenly convex throughout; femora and tibiae variously colored 58
58. Supraantennal swelling markedly enlarged, with practically vertical lateral sides (Figs. 58a, c–e), not connected to antennal socket rim, which is markedly higher dorsally than ventrally . . . . . *bipustulosus* Arnold, p. 147
Supraantennal swelling the usual shape in most species, but enlarged in *mashona* (in which it is fused with antennal socket rim) and *ovambo* (in which it is markedly lower, with lateral sides swollen, not perpendicular); antennal socket rim about equal in height dorsally and ventrally except higher dorsally in *mashona* and slightly so in *ovambo* 59
59. Supraantennal swelling enlarged but not fused with antennal socket rim (Fig. 267c); length of midtarsomeres II and III 1.8 and 1.3 × respective apical width; femora and tibiae red; punctures of pygidial plate averaging less than one diameter apart . . *ovambo* Pulawski, sp. nov., p. 467
Supraantennal swelling not enlarged except in *mashona*; length of midtarsomeres II and III 1.3–1.4 and 0.8–0.9 × respective apical width (1.6 and 1.0 in *oberon*, 1.9 and 1.1 in *tembe*); femora and tibiae black except red in some *oberon*; punctures of pygidial plate: see next couplet 60
60. Pygidial plate with punctures several to many diameters apart mesally 61
Most or all punctures of pygidial plate less than one diameter apart 62
61. Distance between clypeal lip corners equal to 1.3 clypeal midlength; clypeal lip somewhat produced mesally (Fig. 260a), exceptionally with three teeth; mesopleuron with well-defined punctures that are about one diameter apart; length of midtarsomere II about 1.6 × apical width, of midtarsomere III about equal to apical width; apical tarsomeres without ventral spines . . . . . *oberon* Arnold, p. 454
Distance between clypeal lip corners equal to clypeal midlength; clypeal lip shallowly emarginate (Fig. 383); mesopleuron with ill-defined punctures that are about 2–3 diameters apart near center; length of midtarsomere II 1.9 × apical width, of midtarsomere III about 1.1 × apical width; apical tarsomeres with at least one apicomedian spine on venter . . . . . *tembe* Pulawski, p. 624
62. Supraantennal swelling punctate (as in Fig. 316a); clypeal lip with one lateral incision on each side (Fig. 364a); setae of postocellar area appressed . . . . *spectrum* Pulawski, sp. nov., p. 600
Supraantennal swelling impunctate; clypeal lip with two lateral incisions on each side; setae of postocellar area erect, about one midocellar diameter long 63
63. Supraantennal swelling enlarged, fused with antennal socket rim (Fig. 224c); clypeal lobe narrower (Fig. 224a), distance between corners 1.3 × clypeal midlength, bevel evenly convex; apical margin of forebasitarsus practically straight . . . . . *mashona* Arnold, p. 399
Supraantennal swelling the usual shape, not fused with antennal socket rim; clypeal lobe wider (distance between corners 1.6 × clypeal midlength), bevel slightly impressed; apical margin of forebasitarsus emarginate (as in Fig. 54d) . . . . . *eurystoma* Pulawski, sp. nov., p. 273
64. Upper frons markedly swollen (Figs. 111c, 198c); sternum I without median carina; setae fully concealing integument on outer hindfemoral surface, at least in ventral half, and labrum flat, not protruding beyond clypeal free margin; gaster all or largely red. Northeast Africa, Sudan,

Syria, Arabian Peninsula 65
Frons evenly convex, somewhat swollen in upper half in *osiris* (in which sternum I is carinate mesally) and markedly so in *ramses*; setae not concealing integument on outer hindfemoral surface except concealing in *micans* and *ramses* (in which labrum is conspicuously convex and protruding beyond clypeal free margin); gaster red to black. 66

65. Clypeus with well-defined bevel (Fig. 198a); flagellum black; setae not concealing integument on interocellar area; crossvein cu-a of hindwing with anal end further away from wing base than cubital end (as in Fig. 102a); pygidial plate constricted preapically (Fig. 198e) . . . . . *isis* de Beaumont, p. 362
Clypeus without bevel (Fig. 111a); flagellum reddish in basal half; setae fully concealing integument on interocellar area; crossvein cu-a of hindwing vertical or nearly so; pygidial plate not constricted . . . . . *deserticola* de Beaumont, p. 234

66. Sternum I with apical depression bisected by longitudinal carina (Fig. 132a) and propodeal posterior face with wide median impression in dorsal half or third; hindwing crossvein cu-a with anal end further away from wing base than cubital end (Fig. 102a), but vertical or nearly so in many southern African *costae*, some *detritus*, and some *schoenlandi* 67
Sternum I with or without apical depression bisected by longitudinal carina; if depression and carina present, then propodeal posterior face with longitudinal sulcus (except *kalaharicus*); hindwing crossvein cu-a varying, but in most specimens vertical (as in *kalaharicus*) or with anal end closer to wing base than cubital end 74

67. Apical tarsomeres of mid- and hindtarsi without spines on lateral margins 68
Apical tarsomeres of mid- and hindtarsi each with 1–3 small spines near midlength of each lateral margin (Figs. 132b, c) 70

68. Labrum: median notch evanescent; clypeal lip not incised laterally; frons markedly convex; scutal setae entirely concealing integument; hindfemoral venter largely glabrous; flagellum largely red; marginal cell sparsely microsetose; length 11–13 mm. . . . . *osiris* de Beaumont, p. 465
Labrum: median notch well defined; clypeal lip incised laterally; frons not unusually convex; scutal setae not concealing integument on disk; hindfemoral venter setose; flagellum black; marginal cell densely microsetose; length 12–18 mm. 69

69. Clypeal bevel clearly step-like; gena present in dorsal view (Fig. 360c); setae largely but not entirely concealing integument on thorax and gena; pygidial plate broad basally and contrastingly narrowing preapically (Fig. 360d) . . . . . *sordidus* (Dahlbom), p. 594
Clypeal bevel at most minimally step-like; gena practically absent in dorsal view; setae fully concealing integument on scutum anterolaterally and on mesopleuron, nearly so on gena; pygidial plate gradually narrowing posterad . . . . . *grandissimus* Gussakovskij, p. 319

70. Setae straight or angled apically on head, thorax (except propodeum posterolaterally), and forecoxa 71
Setae sinuous on gena, mesopleuron anteroventrally, propodeal dorsum, and forecoxa . . . 73

71. Labrum: median notch inconspicuous or absent; gaster red basally. Southern Africa . . . . . *schoenlandi* Cameron, p. 572
Labrum: median notch well defined; gaster all black except red basally in many European and Asian *costae* 72

72. Pygidial plate margined laterally; gaster all black or red basally . . . . . *costae* (De Stefani Perez), p. 218
Pygidial plate not margined laterally, at least near apex, most of margin delineated by row of setigerous punctures (Figs. 132d, e) in most specimens; gaster black . . . . . .

. . . . . *erythropus* (Spinola), p. 265

73. Tergum I without erect setae; scutum not punctatorugose . . . . . *sericeus* (F. Smith), p. 579
Tergum I with erect setae basolaterally; scutum in some specimens punctatorugose. . . . . *detritus* Arnold, p. 240

74. Pygidial plate narrowly ovoid, densely setose apically (Fig. 188d); foretarsal rake short: spines (except basal and apical) shorter than basitarsus width, apical spine of forebasitarsus shorter than tarsomere II (Fig. 188c); legs and gaster black. Kenya. . . . . *iaphetes* Pulawski, sp. nov., p. 345
Pygidial area triangular, at most with a few, sparse setae; middle forebasitarsal spines longer than basitarsus width, apical spine longer than tarsomere II except in *brevipecten* (in which tibiae and in most specimens parts of gaster are red) 75

75. Gaster and tibiae black; terga without silvery apical fasciae; setae of propodeal dorsum erect or inclined posterad; labrum flat, not protruding beyond clypeal free margin; middle clypeal section convex; supraantennal swelling the usual size 76
Gaster and/or tibiae red (all or partly) or black; if black, then at least terga I–III silvery fasciate apically and/or dorsal propodeal setae diverging anterolaterad from midline (propodeal dorsum glabrous in some species, at least apicomesally); tergal fasciae inconspicuous in some *notogoniaeformis* (Morocco to Libya) in which labrum in conspicuously convex and protruding from beneath the clypeus, in some *priesneri* (North Africa to Mali and Pakistan) in which middle clypeal section is flat, and in *pusulosus* (Morocco to Turkey) in which the supraantennal swelling is unusually large 80

76. Setae straight on postocellar area, lower gena, and thorax (at most angled apically), appressed or nearly so on midfemoral venter; near anterior end of scutum about as long as midocellar diameter; mesopleuron dull, with minute, inconspicuous punctures. Southern Africa. . . . . *vanrhynsi* Arnold, p. 646
Setae sinuous on thorax; near anterior end of scutum markedly longer than midocellar diameter; mesopleuron variously punctured 77

77. Free margin of clypeal lip not emarginate mesally nor incised laterally (Fig. 166b). Abd el Kuri Island . . . . . *glaber* Kohl, p. 314
Free margin of clypeal lobe emarginate mesally and/or incised laterally (Figs. 106a, 126c, 300a). Southern Africa 78

78. Width of postocellar area 1.1–1.6 × length; basal declivity of tergum I and hindfemoral venter, in many but not all specimens, with erect setae. . . . . *punctatiformis* Arnold, p. 514
Width of postocellar area 0.8–1.0 × length; tergum I with appressed setae; setae of hindfemoral venter nearly appressed, shorter than midocellar diameter 79

79. Propodeal dorsum irregularly ridged or rugose; mesopleuron between punctures varying from unsculptured to microsculptured. . . . . *crassipes* Arnold, p. 227
Propodeal dorsum regularly ridged longitudinally; mesopleuron unsculptured between punctures . . . . . *ebeninus* Arnold, p. 258

80. Hindcoxal dorsum with inner margin markedly expanded basally (Fig. 362a); clypeal middle section convex, with well-defined bevel; body black 81
Hindcoxal dorsum not expanded except slightly expanded in some extralimital populations of *fugax* (in which middle clypeal section is flat, without bevel); body black or partly red. . . 84

81. Free margin of clypeal lip arcuate to sinuate, without median tooth, median emargination, or lateral incisions (Fig. 283a); trimmal carina of mandible with conspicuous tooth, without cleft (Fig. 283a); propodeum with carina between dorsum and side; propodeal side punctate, dorsum in most specimens with transversely ridged median or apicomedian area that contrasts in sculp-

ture with adjacent areas (Figs. 283c, d); forebasitarsus rake with median gap between basal and apical clusters of spines (Fig. 283e) . . . . . *plicosus* (A. Costa), p. 495
Free margin of clypeal lip with median tooth or emargination and with lateral incisions; trimmal carina of mandible with two teeth of usual size that are separated by cleft; propodeum not carinate between dorsum and side; propodeal side ridged, dorsum without specialized median area; forebasitarsus with rake spines evenly distributed along its entire length 82

82. Clypeal lip with obtuse median tooth (Fig. 226c); setae sinuous on postocellar area . . . . . *mediterraneus* Kohl, p. 404
Free margin of clypeal lip at least shallowly emarginate mesally (Figs. 104a, 261a); setae of postocellar area straight or angled apically 83

83. Mesopleuron punctate; scutal hindcorner roundly prominent (as in Fig. 334a); punctures large, conspicuous on sterna I and II, gradually decreasing in size on following sterna. Southern Africa . . . . . *octodentatus* Arnold, p. 458
Mesopleuron punctatorugose; scutal hindcorner nonprominent; sternal punctures minute, inconspicuous. Mali, Niger . . . . . *coxalis* Pulawski, sp. nov., p. 225

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180. Clypeal lip emarginate laterally (Fig. 238); propodeal side in many specimens ridged behind spiracle . . . . . *mocsaryi* Kohl, p. 422
Clypeal lip straight or shallowly concave laterally; propodeal side not ridged 181

181. Pygidial plate slightly convex both transversely and longitudinally, shiny, unsculptured between punctures, with lateral carina lower than average for the genus (Figs. 245c, d); free margin of clypeal lip arcuate, without lateral incision, at most with a rudimentary median notch (Fig. 245a). . . . . *mycerinus* de Beaumont, p. 432
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182. Scutal punctures well defined, many punctures on disk 2–3 diameters apart; setae of propodeal dorsum oriented anterad (as in Fig. 124a). Island of Socotra . . . . . *socotrae* Pulawski, sp. nov., p. 592
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183. Clypeal free margin shallowly concave between lip corner and orbit (Fig. 91a); trimmal carina of mandible with low, somewhat rounded teeth (Fig. 91a); posterior face of head, in dorsal half, with semi-erect setae, some oriented dorsad (Fig. 91c); longest setae of lower gena 1.5–2.0 × midocellar diameter (Fig. 91c); propodeal side setose throughout. North Africa south to Senegal and Somalia . . . . . *cheops* de Beaumont, p. 194
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in dorsal half, with appressed setae except setae semi-erect in Ethiopian, Kenyan, and West African populations of *calidus*; propodeal side glabrous anteriorly except all setose in desert populations of *panzeri* and in West African populations of *calidus* 184

184. Southern Africa, Ethiopia and Kenya, West Africa; longest setae of lower gena visibly exceeding midocellar diameter in specimens from Ethiopia, Kenya, and West Africa (Fig. 77f).... ..... *calidus* Pulawski, sp. nov., p. 178

Africa south to central Sudan and central Mali, Europe, Asia east to Sri Lanka and Kazakhstan; setae of lower gena shorter to slightly longer than midocellar diameter .... *panzeri* (Vander Linden), p. 473

♂♂

Unknown and not included: *fasciatus* (Egypt), *glaber* Kohl (Abd el Kuri Island), *gracilicornis* (Algeria), *iaphetes* (Kenya), *tembe* (South Africa), and *venator* (Zambia).

1. Episternal sulcus absent, mesopleural integument easily visible (Fig. 65d)..... ..... *brevipennis* Mercet, p. 159

Episternal sulcus present, concealed by vestiture in some species 2

2. Sterna II–VI covered almost margin to margin with conspicuous, uniform, suberect setae that fully conceal integument (Figs. 347b–d); most thoracic setae sinuous; forebasitarsus with at least three rake spines, outer apical spine of tarsomere II no longer than tarsomere III, mid- and hindtarsomeres V with central cluster of small spines on venter (Fig. 347a), and gaster red. Angola to South Africa..... *scopa* Pulawski, sp. nov., p. 575

Sterna II–VI without such setae or, if setae similar, then thoracic setae, rake spines, spines of apical tarsomeres, and color of gaster not in above combination 3

3. Forefemur entire..... 4

Forefemur emarginate basally 12

4. Labrum flat; foretarsus without rake (basitarsus without preapical spines, apical spine of tarsomere II less than this tarsomere width); sternum VII with dense, long setae that extend beyond sternum's hindmargin as conspicuous fringe (Fig. 416b); apical emargination of sternum VIII unusually shallow (Fig. 416c); mesopleuron with well-defined punctures and shiny interspaces..... *zambius* Pulawski, sp. nov., p. 663

Labrum convex (as in Fig. 270e); foretarsus with rake (basitarsus with several preapical spines, apical spine of tarsomere II at least slightly longer than this tarsomere width); sternum VII with short setae that do not form apical fringe; apical emargination of sternum VIII deeper; mesopleuron varying 5

5. Postocellar area unusually wide (Fig. 161b), width at least twice length; sterna without setal fringes..... 6

Postocellar area narrower, width no more than 1.5 × length; at least sterna V and VI (except laterally) each with erect, subbasal fringe of agglutinated setae (Figs. 276a–f), although fringes are visible only when sterna are fully extended 10

6. Setae of postocellar area erect; propodeal side glabrous adjacent to metapleural sulcus; scutal hindcorner not expanded 7

Setae of postocellar area appressed; propodeal side setose throughout; scutal hindcorner roundly expanded (Fig. 219a) 9

7. Dorsal volsellar process long, narrow (Fig. 250); outer apical spine of foretarsomere II about as long as tarsomeres III and IV combined ..... *niloticus* Pulawski, p. 439

Dorsal volsellar process low, rounded (Figs. 161e, 187); outer apical spine of foretarsomere II

shorter. 8

8. In most specimens setae not concealing integument between midocellus and antennal socket; apex of penis valve narrow (Fig. 161f) . . . . . *geniculatus* (Spinola), p. 306
Setae concealing integument between midocellus and antennal socket; apex of penis valve rounded in Egyptian specimens (Fig. 187) . . . . . *horus* de Beaumont, p. 343

9. Apical margin of sternum VIII with rounded median projection (Fig. 219b) or evenly emarginate; volsella: Fig. 219c; mesothoracic venter of many specimens sparsely punctate anterad of each midcoxa (punctures several to many diameters apart); foretarsal rake in many specimens longer: apical spine of foretarsomere II about as long as tarsomeres III and IV combined . . . . . *luxuriosus* Morice, p. 393
Apical margin of sternum VIII with median projection that is shallowly emarginate mesally (Fig. 193a); volsella: Fig. 193b; mesothoracic venter densely punctate (punctures less than to insignificantly more than one diameter apart); foretarsal rake shorter: apical spine of foretarsomere II varying from slightly shorter to slightly longer than tarsomere III . . . . . *inextricabilis* Pulawski, p. 356

10. Setae sinuous on gena and thorax (except on mesothoracic venter), markedly longer than midocellar diameter on scutum, erect on basal declivity of tergum I; hindfemoral venter asetose except basally; sternum III and IV subbasally each with setal fringe (fringes visible only when sterna are fully extended) . . . . . *gastrotrichus* Pulawski, sp. nov., p. 304
Setae straight on gena and thorax, about as long as midocellar diameter on scutum, appressed on tergum I; hindfemoral venter setose; sterna III and IV without subbasal fringes 11

11. Distance between corners of clypeal lip smaller than distance between corner and orbit (Fig. 275b); bevel about as long as basomedian area; trimmal carina with well-defined tooth (Fig. 275b); hindfemoral venter with inner (= posterior) margin sharp in distal half; apicolateral prong of sternum VIII, in most specimens, incised on inner side (Fig. 275c); volsella: Fig. 277a . . . . . *pentheri* Cameron, p. 482
Distance between corners of clypeal lip greater than distance between corner and orbit (Fig. 321b); bevel absent or reduced to narrow zone along center of lip base; trimmal carina with low, obtuse tooth (Fig. 321b); hindfemoral venter with inner (= posterior) margin obtuse; apicolateral prong of sternum VIII not incised; volsella: Fig. 321c. . . . . *rotundus* Pulawski, sp. nov., p. 540

12. Setae of sternum III markedly longer and denser on apical depression than anterolaterally; sternum I with apical depression bisected by longitudinal carina (Fig. 132a) 13
Apical depression of sternum III glabrous or setae not longer or insignificantly longer and not denser than those on sternum's anterolateral portion (longer posteriorly than anteriorly in *modestus* in which sternum I has no longitudinal carina) 21

13. Apical depressions of sterna II and III each with conspicuous fringe of agglutinated setae that extend beyond sternal hindmargin (Figs. 344c–e). Southern Africa 14
Sternum II without setal fringe, setae of apical depression markedly shorter that those on apical depression of sternum III 15

14. Setae of postocellar area appressed; labrum convex apically, slightly protruding beyond clypeal free margin (Fig. 217d); galea in lateral view longer than wide; mesopleuron with well-defined punctures; base of forefemoral notch without tuft of setae; forebasitarsus without preapical rake spines; cubital and anal ends of hindwing vein cu-a equidistant from wing base . . . . . *luctuosus* Arnold, p. 390
Setae of postocellar area erect; labrum flat, not protruding or minimally protruding beyond clypeal free margin; galea in profile shorter than wide; mesopleuron with ill-defined punctures;

base of forefemoral notch with tuft of setae (Fig. 344a); forebasitarsus with 3–5 rake spines (Fig. 344b); anal end of hindwing vein cu-a in most specimens further away from wing base than cubital end (as in Fig. 102a) . . . . . *schoenlandi* Cameron, p. 572

15. Apical depressions of sterna III–V with dense (as if agglutinated) setae (Figs. 171c–e). Northern Hemisphere 16
Apical depressions of sterna IV and V with less dense setae, not appearing agglutinated (Figs. 101, 133b, 360e), also sternum III in many specimens 18

16. Mesopleural punctures compressed against each other or nearly so; frontal setae silvery . . . . . *grandissimus* Gussakovskij, p. 319
Many mesopleural punctures more than one diameter apart; frontal setae golden except silvery in smallest specimens 17

17. Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III; sternum I largely glabrous . . . . . *osiris* de Beaumont, p. 465
Outer margin of forebasitarsus with at most one preapical rake spine that is close to apical one; outer apical spine of foretarsomere II as long as tarsomere III or shorter; sternum I all setose . . . . . *sordidus* (Dahlbom), p. 594

18. Head, thorax, and forecoxa without sinuous setae (setae straight or angled apically) 19
Setae sinuous on gena, mesopleuron anteroventrally, propodeal dorsum, and forecoxa . . . 20

19. Forefemoral notch with basal tuft of erect setae (Palearctic specimens) or tuft absent (Afrotropical specimens), bottom not compressed; gaster black or red basally . . . . . *costae* (De Stefani Perez), p. 218
Forefemoral notch without basal tuft of erect setae, with bottom compressed into narrow crest (Fig. 133a); gaster black . . . . . *erythropus* (Spinola), p. 265

20. Outer margin of forebasitarsus without preapical spines or, exceptionally, with one or two such spines next to apex; scutum not punctatorugose; forefemoral notch of usual size; setae of apical depression of sternum III in many specimens dense, as if agglutinated . . . . . *sericeus* (F. Smith), p. 579
Outer margin of forebasitarsus with 3–5 preapical rake spines and/or scutum punctatorugose (at least anteriorly); forefemoral notch in some specimens unusually small; setae of apical depression of sternum III not agglutinated . . . . . *detritus* Arnold, p. 240

21. Scutum coarsely punctatorugose or areolate (Fig. 342c), hindcoxal dorsum not angulate basally; setae of postocellar area sinuous, longer than midocellar diameter; gaster red basally except all black in some Syrian specimens of *schmiedeknechti* 22
Scutum punctate, punctatorugose near margins in some *mediterraneus* which has hindcoxal dorsum conspicuously angulate basally (as in Fig. 262a), areolate in some *vulneratus* in which setae of postocellar area are straight, either appressed or erect, about as long as midocellar diameter; gaster black (red apically in some *mediterraneus* and some *vulneratus*) 23

22. Free margin of clypeal lobe evenly arcuate (Fig. 342b); inner hindtibial spur with widely spaced rays (Fig. 343b); gastral terga without silvery, apical fasciae . . . . . *schmiedeknechti* Kohl, p. 568
Free margin of clypeal lobe with obtuse, median projection, concave between projection and corner (Fig. 289b); inner hindtibial spur with usual, closely spaced rays; terga I–III silvery fasciate apically . . . . . *prosopigastroides* Bischoff, p. 502

23. Sterna III–V largely impunctate and asetose except for apicomedian tuft or apicomedian fascia of erect setae (Figs. 293c–e, 373c, d) in addition to usual stiff setae at base of apical depression (fascia in some specimens rudimentary, difficult to see); setae curved or sinuous on each side of hypostoma; labrum flat. Southern Africa 24

Sterna III–V setose or, if largely impunctate and asetose, without apicomedian tuft of fascia of erect setae, integument punctate or impunctate; setae adjacent to hypostoma straight to sinuous; labrum flat to markedly convex 25

24. Forefemoral notch microscopically setose (Fig. 203a); erect apicomedian setae of sterna III–V emerging from single transverse line (Figs. 203d, e); foretarsomere I with 0–3 preapical rake spines; outer apical spine of foretarsomere II shorter than tarsomere III (Fig. 203b) . . . . . *kalaharicus* Arnold, p. 369

Forefemoral notch glabrous; erect apicomedian setae of sterna III–V emerging from small, longitudinally elongate area (Figs. 373c, d); foretarsomere I with three or four preapical rake spines; outer apical spine of foretarsomere II longer than tarsomere III (Fig. 373b) . . . . . *subfimbriatus* Arnold, p. 610

25. Hindwing vein cu-a oblique, with anal end further away from wing base than cubital end (as in Fig. 102a) and sterna IV–VI impunctate (including apical depressions) or with a few, sparse punctures, practically glabrous except densely punctate and setose anterolaterally 26

Hindwing vein cu-a vertical (anal and cubital ends equidistant from wing base) and/or sterna setose throughout 28

26. Frons, postocellar area, mesothorax, and tergum I with appressed setae; gaster red at least basally. Libya to Syria and Oman . . . . . *isis* de Beaumont, p. 362

Head, postocellar area, mesothorax, and basal declivity of tergum I with erect setae (Fig. 16); gaster black. 27

27. Postocellar area narrow (Fig. 14b), width 0.7–1.3 × length; scutal punctures no more than one diameter apart (Figs. 15a, b) . . . . . *albocinctus* (Lucas), p. 92

Postocellar area wide (Fig. 70b), width 1.7–2.0 × length; discal punctures of scutum several to many diameters apart (Figs. 71a, b). . . . . *bruneiceps* Arnold, p. 171

28. Maxillary stipes with sinuous, suberect setae; labrum flat, not protruding from beneath clypeus; galea membranous; setae erect and sinuous adjacent to entire occipital carina; punctures of sterna II–VI several to many diameters apart mesally and contrastingly dense laterally. Egypt, Turkmenistan . . . . . *crocodilus* Pulawski, p. 230

Setae of maxillary stipes minute, straight, appressed; other characters not in above combination 29

29. Sterna IV–VI impunctate mesally from base to apex or with a few, sparse punctures, practically glabrous; width of postocellar area 0.5–1.3 × length; outer margin of forebasitarsus with at least four rake spines; outer apical spine of foretarsomere II longer than tarsomere III, and at least terga I–III silvery fasciate apically 30

Sterna IV–VI densely punctate and setose (apical depression contrastingly unsculptured and asetose in *asmara, crassipes, ebeninus, fulgidus, mesembrius, vanrhynsi*, and most *punctatiformis*); if largely impunctate and asetose, then either width of postocellar area more than twice length (some *erythrurus*), or outer margin of foretarsomere I with 0–2 spines and outer apical spine of foretarsomere II shorter than foretarsomere III (*plicosus, tanqua, theseus*, some *mashona*, some *oberon*), or terga nonfasciate (some *crassipes* and *punctatiformis*) 40

30. Setae of tergum I conspicuous, largely concealing integument; apical portion of forewing longer (Fig. 408a); frons bulging at about midheight (Figs. 111e, 406e) 31

Setae of tergum I not conspicuous, integument easily visible; apical portion of forewing shorter (as in Figs. 40a, 309a, b); frons uniformly convex 32

31. Forefemoral notch deep, covered with erect setae, margined posteriorly (Fig. 406f); frontal bulge lower (Fig. 406e); foretibia uniformly, densely setose. . . . . *vestitus* Kohl, p. 650

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111d); foretibia with only a few setae along outer edge, practically glabrous ..... *deserticola* de Beaumont, p. 234

32. Clypeal lip without median projection, its free margin evenly arcuate (Figs. 118b, 409b); galea sclerotized. . . . 33
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33. Mesopleuron either with well-defined punctures or areolate; forefemoral notch of average size; trimmal carina of mandible deeply emarginate distad of tooth (Fig. 409b); clypeal lobe wider, lip corners closer to respective orbit than to one another (Fig. 409b); tibiae all red ..... *vulneratus* R. Turner, p. 654
    Mesopleuron with ill-defined punctures, appearing evenly, finely sculptured; forefemoral notch unusually large (Fig. 118c); trimmal carina of mandible not emarginate distad of tooth (Fig. 118b); clypeal lobe narrower, lip corners closer to each other than to orbit (Fig. 118b); tibiae black except foretibial inner surface reddish. Turkey and Cyprus to Tajikistan, Arabian Peninsula ..... *dignus* Kohl, p. 246
34. Mesopleuron with well-defined punctures, vestiture not concealing integument; sternum VIII markedly tridentate apically in some populations. Subsaharan Africa ..... *argenticeps* Arnold, p. 115
    Mesopleuron at most with ill-defined punctures, vestiture concealing or not concealing integument; sternum VIII evenly emarginate apically. . . . 35
35. Forefemoral notch shallower, about 0.2 × femoral diameter in posterior view 36
    Forefemoral notch deeper, about 0.3 × femoral diameter or more in posterior view (Figs. 109e, 113d). . . . 38
36. Free margin of clypeal lip markedly sinuate (Fig. 225b) ..... *mauretanus* Pulawski, p. 402
    Free margin of clypeal lip not sinuate (Figs. 27b, 200b). . . . 37
37. Middle projection of clypeal free margin inconspicuous to roundly prominent (Fig. 27b), bevel absent; mesopleural vestiture concealing integument in fresh specimens ..... *argentatus* Gussakovskij, p. 112
    Middle projection of clypeal free margin conspicuous (Fig. 200b); bevel present to rudimentary; mesopleural vestiture not concealing integument ..... *julliani* Kohl, p. 364
38. Bottom of forefemoral notch with minute but conspicuous, erect setae (Fig. 113d); mesopleural vestiture not concealing integument; gaster in vast majority of specimens black ..... *desertorum* F. Morawitz, p. 237
    Bottom of forefemoral notch asetose or with inconspicuous setae; mesopleural vestiture concealing integument in fresh specimens; gaster at least partly red 39
39. Forefemur markedly curved in dorsal view (Fig. 109d), its notch without platform (Fig. 109e). Sinai and Israel to Turkmenistan ..... *curvipes* Pulawski, sp. nov., p. 232
    Forefemur slightly curved in dorsal view (Fig. 191c), its notch with well-defined platform (Fig. 191d). Southern Sahara. . . . *incanus* de Beaumont, p. 349
40. Scutum longitudinally ridged at least in posterior half (Figs. 315e, 316c); supraantennal swelling, in vast majority of specimens, densely punctate like adjacent frons (Fig. 316a) ..... *rhacodes* Pulawski, sp. nov., p. 534
    Scutum not ridged except ridged next to hindmargin in some *tryssus*; supraantennal swelling punctate or impunctate. . . . 41
41. Supraantennal swelling punctate and setose, not concealed by vestiture (as in Fig. 316a); labrum convex near free margin, with usual row of apical setae; propodeal side mostly ridged

(unridged in smallest *asinus*); gaster red at least basally 42
Supraantennal swelling fully concealed by vestiture or impunctate and glabrous except punctate in *spectrum* (in which the gaster is all black and propodeal side unridged), some *ulonyovu* (in which labrum is flat and propodeal side unridged), in some *harpax* (in which apical setae of labrum are short, thickened, Fig. 178c, and gaster of many specimens is black), and in many *tryssus* (in which labrum is flat and gaster all black) 45

42. Sternum I with median carina that is markedly prominent near apex, higher than midocellar diameter (Fig. 88c); femora and tibiae in most specimens black .....
..... *carinatus* Pulawski, sp. nov., p. 191
Sternum I without carina; at least tibiae red 43

43. Scutum uniformly, closely punctate, punctures less than one diameter apart, about as large as those on postocellar area; forefemur densely punctate and setose; apical depressions of sterna III–VI with suberect setae (setae appressed in smallest specimens). . . . *asinus* Arnold, p. 124
Scutum unevenly punctate (at least a few discal punctures more than one diameter apart), punctures at least slightly larger than those on postocellar area; forefemoral posteroventral surface impunctate at least in apical third (impunctate zone narrow or wide); sternal setae appressed or suberect. 44

44. Free margin of clypeal lip obtusely pointed, straight or concave between midpoint and corner (Fig. 265b); apical depressions of sterna III–VI with suberect setae .....
..... *onager* Pulawski, sp. nov., p. 463
Free margin of clypeal lip arcuate (Fig. 336b); setal sterna appressed or nearly so. .....
..... *scaber* Pulawski, sp. nov., p. 562

45. Posteroventral fore- and/or midfemoral surface impunctate or with punctures that are many diameters apart, these surfaces thus appearing almost glabrous (Fig. 308d); vertex width at most 1.5 × length; galea at most as long as scape; sterna uniformly setose throughout. . . . 46
Fore- and midfemora densely punctate, uniformly setose (punctures about one diameter apart, inconspicuous in some species), but several diameters apart in *omoi* (in which vertex width is 2.5–3.0 × length), in African populations of *longipalpis* (in which galea is twice as long as scape), and apically so in some *vanrhynsi* (in which apical depressions of sterna II–VI are glabrous). 63

46. Apical spine of foretarsomere II longer than this tarsomere's width; forebasitarsus with 3–7 rake spines 47
Apical spine of foretarsomere II not longer than this tarsomere's width; forebasitarsus with 1–3 rake spines 53

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119. Forefemoral notch impunctate and glabrous or with sparse, microscopic punctures and setae (Fig. 163); tibiae black (at least hindtibia) in many specimens. Kenya to Namibia and South Africa ..... *georgii* Arnold, p. 309
Forefemoral notch densely, microscopically punctate and setose (asetose in some Egyptian *palopterus*); tibiae red (all or partly) in African specimens but all black in many *mocsaryi* from Algeria and Morocco, also femora red in many specimens 120

120. Dorsal volsellar process not differentiated or lower than wide (nearly as high as wide in many southern African *dissimulatus*), with lateral margins mostly ill defined or diverging toward base (Figs. 120c, d, 124b, 140, 246a, b, d, e, 271, 376f) 121
Dorsal volsellar process as high as wide or higher, slightly lower in some *palopterus* (which occurs north of equator), its lateral margins parallel to concave, diverging toward base in some *palopterus* 126

121. Setae of propodeal dorsum all oriented anterad or anterolaterad (Fig. 124a); those adjacent to oral fossa (next to occipital carina) slightly longer than midocellar diameter; forefemoral notch densely, microscopically punctate and setose (Figs. 123f, g) ..... *dolosus* Arnold, p. 254
Setae of propodeal dorsum variously oriented but not as above, those adjacent to oral fossa shorter than midocellar diameter except in some Saharan *panzeri*; forefemoral notch different 122

122. Forefemoral notch characteristically microareolate (Figs. 138e, f), appearing uniformly mat under lower magnifications, unusually large (Figs. 138c, d), deeper and longer than average for the genus, but shallow in smallest specimens in which forebasitarsus has three rake spines or less ..... *excavatus* Pulawski, sp. nov., p. 275
Forefemoral notch of usual size, not microareolate; forebasitarsus with 4–7 rake spines . 123

123. Free margin of clypeal lip obtusely pointed, not emarginate (Fig. 245b) ..... *mycerinus* de Beaumont, p. 432
Free margin of clypeal lobe not pointed, with median emargination (emargination vestigial in some *panzeri*) 124

124. Foretibial outer surface glabrous or sparsely setose. Zimbabwe ..... *sycorax* Arnold, p. 615
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126. Trimmal carina of mandible obtuse distad of tooth but contrastingly sharp preapically; clypeal lobe broad, lip corners closer to orbit than to each other (Figs. 81a, 378b). South of equator 127
Trimmal carina of mandible sharp between tooth and apex; clypeal lip corners closer to each other than to orbit or equidistant in some species (but closer to orbit in *cheops*, most *palopterus*, and many *ptah*). North of equator 128

127. Hindfemoral venter with inner (= posterior) margin obtuse; galea with ill-defined punctures, interspaces aciculate, dull; apical margin of sternum VIII tridentate (middle tooth in some specimens round, broad projection); gaster black (apex red in some specimens). Namibia ..... *camptopygus* Pulawski, sp. nov., p. 183
Hindfemoral venter with inner (= posterior) margin sharp (carina-like) in distal half; galea with well-defined punctures, interspaces unsculptured, shiny; apical margin of tergum VIII without median tooth; gaster red basally. Kenya, Tanzania, Namibia . *taita* Pulawski, sp. nov., p. 617

128. Setae of propodeal dorsum along midline oriented all anterad, remaining setae oriented anterolaterad or laterad (as in Fig. 124a); clypeal lip corner somewhat prominent (Fig. 359b). Island of Socotra ..... *socotrae* Pulawski, sp. nov., p. 592
At least some setae of propodeal dorsum oriented posterad; clypeal lip corner nonprominent. Continental Africa 129

129. Setae not longer than midocellar diameter adjacent to oral fossa next to occipital carina 130
Setae longer than midocellar diameter adjacent to oral fossa next to occipital carina (Figs. 77e, f, 91c) 133

130. Scutal punctures well defined, two to several diameters apart on at least part of disk; forefemoral notch densely, microscopically ridged, appearing dull under lower magnifications (Figs. 75a, b). Southern Africa ..... *caliban* Arnold, p. 175
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131. Bottom of forefemoral notch broad, nearly as wide as long, with microscopic appressed setae or asetose; hindfemoral venter with inner (= posterior) margin obtuse; dorsal volsellar process either longer than wide and forming widely obtuse angle with volsella's apical portion or about as long as high (Figs. 269c, d) ..... *palopterus* (Dahlbom), p. 470
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132. Galea aciculate, with a few, ill-defined punctures; propodeal side unridged ..... *ptah* Pulawski, p. 510
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133. Hindfemoral venter with inner (= posterior) margin obtuse; clypeus with free margin of lateral section unusually shallowly emarginate (Fig. 91b); oblique carina emerging from lip corner not extending onto bevel, bevel shorter than basomedian area to nearly reduced; propodeal side setose throughout ..... *cheops* de Beaumont, p. 194
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137. Mesothoracic venter with anterior (oblique) portion longer than posterior (horizontal) part (Fig. 130); dorsal length of flagellomere I 1.5–2.2 × apical width, ventral length conspicuously greater than apical width; forefemoral notch obtusely angulate basally ..... *erythrophorus* Dalla Torre, p. 262
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142. Frontal setae golden; tibiae all or partly reddish ..... *ebeninus* Arnold, p. 258
Frontal setae silvery; tibiae black 143

143. Setae straight on postocellar area, lower gena, and thorax (at most angled apically), appressed or nearly so on midfemoral venter; mesopleuron dull, with minute, inconspicuous punctures

. . . . . *vanrhynsi* Arnold, p. 646
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Supraantennal swelling not expanded except expanded in *mashona* (in which swelling is fused with antennal socket rim) and slightly so in *ovambo* (in which swelling sides are oblique) 147
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155. Apical tarsomeres with lateral margin obtusely expanded (Figs. 48e, 184e), widest near midlength 156
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157. Free margin of labrum with thick, short setae (Fig. 178c); setae appressed on postocellar area; galea at least slightly longer than wide in profile; tibiae red except in many *harpax*; venter of apical tarsomeres with two or more preapical spines (except one in some *aburi*) 158
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160. Gaster red basally 161
Gaster all black or black with red apex 163

161. Propodeal dorsum rugose, with setae diverging obliquely anterad from midline; scutal punctures coarse; midtrochanteral venter impunctate; frontal setae silvery, fore- and midfemora and fore- and midtibiae black, wing membrane slightly infumate . . . . . *asmara* Pulawski, sp. nov., p. 128
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femora black in some *oberon*, wing membrane yellowish or yellowish basally and brown distally 162

162. Supraantennal swelling markedly enlarged and fused with antennal socket rim (Fig. 224c); rim conspicuously higher dorsally than ventrally; dorsal length of flagellomere I 1.5–1.7 × apical width . . . . . *mashona* Arnold, p. 399

Supraantennal swelling not enlarged or slightly enlarged, not fused with antennal socket rim; rim higher dorsally than ventrally but not unusually so; dorsal length of flagellomere I 1.2–1.3 × apical width . . . . . *oberon* Arnold, p. 454

163. Sterna III–VI mesally with large punctures that are several diameters apart; clypeal lobe flat, without bevel, lip unusually narrow, distance between corners 0.6–0.7 × distance between corner and orbit (Fig. 388b); gastral apex red (at least tergum VII and sterna V–VIII) . . . . . *theseus* Arnold, p. 629

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164. Setae of postocellar area erect and tibiae black 165

Setae of postocellar area appressed to erect; if erect, then tibiae at least partly red 177

165. Clypeal lobe unusually narrow, distance between lip corners smaller than clypeal midlength (Fig. 395b); mesopleural punctures well defined, in many specimens coarse and compressed against each other; sternum VIII conspicuously tridentate apically (Fig. 395c) . . . . . *tryssus* Pulawski, sp. nov., p. 638

Clypeal lobe broader, distance between lip corners equal to clypeal midlength or greater; mesopleuron rugose, punctate (punctures in most specimens one diameter apart or more), or evenly microsculptured; sternum VIII not tridentate except in *consocius* 166

166. Setae of propodeal dorsum erect or inclined posterad (oriented obliquely anterad on large basomedian area in *suavis*) 167

Setae of propodeal dorsum diverging obliquely anterad from midline 168

167. Clypeal lobe narrower, distance between lip corners about 0.9 of distance between corner and adjacent orbit (Fig. 367b); scutal setae appressed; tergum VII posteriorly with obtuse lateral carina, thus with rudimentary pygidial plate . . . . . *suavis* Arnold, p. 604

Clypeal lobe broader, distance between lip corners 1.4–1.5 × distance between corner and adjacent orbit (Fig. 357b); scutal setae suberect; tergum VII without lateral carina . . . . . *silvestris* Pulawski, sp. nov., p. 589

168. Tergum VIII tridentate apically (Fig. 98g), but middle tooth rudimentary in small specimens; flagellomeres III–XI in most specimens with shallow longitudinal sulcus that delimits two differently setose areas (Figs. 98c–f) 169

Tergum VIII not tridentate; flagellomeres evenly setose, without longitudinal sulcus 170

169. Mesopleural setae straight or angles apically. Africa, part of Eurasia . *consocius* Kohl, p. 207

Most mesopleural setae sinuous. Zaire . . . . . *congoensis* Arnold, p. 205

170. Clypeal lip almost reduced laterally, expanded mesally into rounded or almost rectangular plate (Fig. 332b); venter of apical tarsomeres with one or two thin preapical spines (spines rudimentary in smallest specimens); notaulus in many specimens wider and deeper than admedian line (Fig. 334a) . . . . . *saturnus* Arnold, p. 557

Clypeal lip about as wide mesally as laterally; apical tarsomeres without ventral spines; notaulus ill defined, no more conspicuous than admedian line 171

171. Forefemoral notch large, extending far onto anterior surface (Fig. 18c), with proximal margin somewhat produced (obtusely to sharply), ventrally compressed into obtuse, longitudinal crest

. . . . . *ambiguus* Arnold, p. 101

Forefemoral notch smaller (except in *nitidior*), with proximal margin not produced, with venter not compressed into longitudinal crest 172

172. Setae of postocellar area sinuous (Fig. 24b); clypeal middle section convex from base to lip . . . . . *angustus* Arnold, p. 107

Setae of postocellar area straight; clypeal middle section flat or slightly convex apically (slightly convex to slightly concave in *nitidior* and *tarsinus*) 173

173. Forefemoral notch covered with microscopic setae that are markedly denser than on adjacent surface (Fig. 381c). Africa north of equator, parts of Eurasia . . . . . *tarsinus* (Lepeletier de Saint Fargeau), p. 622

Forefemoral notch either glabrous or setose, but then setae not denser than on adjacent surface 174

174. Sternal punctures well defined; forefemoral notch large, extending far onto anterior surface (Figs. 252a–c), its bottom glabrous; mandible in many specimens yellowish reddish mesally. Africa north of equator, parts of Eurasia . . . . . *nitidior* de Beaumont, p. 441

Sternal punctures ill defined; forefemoral notch smaller, its bottom setose; mandible darker 175

175. Clypeal middle section narrower (Fig. 212b): distance between lip corners about 1.2 × clypeal midline; width of postocellar area about 1.3–1.4 × length. Cape Verde Islands, Madeira . . . . *lindbergi* de Beaumont, p. 382

Clypeal middle section wider (Figs. 149b, d): distance between lip corners about 1.4 × clypeal midline; width of postocellar area at least 1.9 × length 176

176. Clypeus without bevel, all densely punctate (Figs. 149b, d); dorsal length of flagellomere IV 1.8–2.8 × width (Fig. 149f); width of postocellar area 1.9–2.2 × length; volsella setose almost to apex (Fig. 151). Continental Africa, Madagascar, parts of Eurasia . . . . . *fugax* (Radoszkowski), p. 287

Clypeus with short bevel and sparse punctation extending to frontoclypeal suture or nearly so (Fig. 43d); dorsal length of flagellomere IV 1.5–1.6 × width; width of postocellar area 2.4–2.8 × length; volsella asetose apically (Fig. 43e). Southern Africa . . . . . *aterrimus* Arnold, p. 130

177. Mesopleuron shiny, unsculptured between punctures; setae of propodeal dorsum oriented obliquely anterad (directed posterad at very apex in some *stevensoni*) 178

Mesopleuron dull, microsculptured between punctures; setae of propodeal dorsum oriented posterad (basomedian setae oriented anterad in most *modestus*) 180

178. Flagellomeres III–IX dorsally with longitudinal sulcus that separates two differently setose areas (as in Figs. 98c–f); width of postocellar area 2.5–3.0 apical width; ventral length of flagellomere I greater than apical width . . . . . *omoi* Guiglia, p. 461

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179. Width of postocellar area 2.2–2.8 × length (Fig. 135b); basal flagellomeres reddish; ventral length of flagellomere I about equal to apical width; midtarsomere IV minimally longer than wide . . . . . *erythrurus* Pulawski, sp. nov., p. 271

Width of postocellar area 0.9–1.1 × length; flagellum black; ventral length of flagellomere I greater than apical width; length of midtarsomere IV equal to apical width or slightly less . . . . . *stevensoni* Arnold, p. 602

180. Clypeal lobe almost flat, bevel not differentiated; setae of postocellar area erect, slightly longer than midocellar diameter; midtarsomere IV slightly wider than long; propodeal side ridged . . . . . *agilis* (F. Smith), p. 88

Clypeal lobe convex, bevel well defined to ill defined; if ill defined, then setae of postocellar area appressed; midtarsomere IV longer than wide or (*paulus, spectrum*) about as long as wide; propodeal side varying 181

181. Sterna IV–VI (at least posteriorly) with erect or suberect setae (Fig. 240c) whose length varies from about one to about two midocellar diameters; punctures of apical sterna conspicuously larger than those of basal sterna . . . . . *modestus* Arnold, p. 426

Sternal setae appressed or nearly so; punctures of apical sterna nearly equal in size to larger (but not conspicuously so) than those of basal sterna 182

182. Mesopleural punctures markedly sparser near center than above scrobe; clypeal lobe slightly longer, its midlength about 1.2 × distance between lip corners; lip free margin more pointed (Fig. 165d); apical margin of sternum VIII evenly emarginate . . . . . *gessianus* Pulawski, sp. nov., p. 312

Mesopleural punctures about evenly spaced near center and above scrobe; clypeal lobe slightly shorter, its midlength about equal to distance between lip corner or smaller; lip free margin more rounded mesally (Figs. 237b, 267b, 273b, 364b); apical margin of sternum VIII in many specimens tridentate 183

183. Supraantennal swelling punctate, dull (as in Fig. 316a); tibiae black . . . . . *spectrum* Pulawski, sp. nov., p. 600

Supraantennal swelling impunctate, shiny; tibiae all or partly red (only parts of foretibia red in some *ovambo*) 184

184. Mesopleural punctures well defined, interspaces microsculptured but shiny; supraantennal swelling slightly larger than average for the genus . . . . . *ovambo* Pulawski, sp. nov., p. 467

Mesopleural punctures ill defined; supraantennal swelling the usual size 185

185. Free margin of clypeal lip roundly prominent to obtusely pointed mesally, concave between midpoint and corner (Fig. 273b); mandibular inner margin evenly curved distad of tooth (Fig. 273b); galea with sparse, nearly evenly distributed punctures; width of postocellar area 0.9–1.1 × length . . . . . *paulus* Pulawski, sp. nov., p. 480

Free margin of clypeal lip not prominent mesally, evenly arcuate (Fig. 237b); mandibular inner margin widely, shallowly emarginate distad of tooth (Fig. 237b); galea with well-defined, densely punctate posterior area, contrasting with sparsely punctate main portion (Fig. 237c); width of postocellar area 0.4–0.5 × length . . . . . *mkomazi* Pulawski, sp. nov., p. 420

Descriptions of Species

Species are arranged alphabetically. Repetitive characters have been omitted. Unless indicated otherwise, the following states apply:

– labrum flat, not protruding or barely protruding beyond clypeal free margin, not emarginate mesally in female;
– galea sclerotized (not membranous), wider than long in lateral view;
– frons with a glabrous, shiny swelling above each antennal socket (swelling not expanded);
– axilla simple, not carinate or unusually convex;
– episternal sulcus present, incomplete;
– mesothoracic venter densely punctate (punctures averaging about one diameter apart);
– metapleural flange not expanded;
– upper metapleural pit round;
– propodeum without carina between dorsum and side, posterior face ridged;
– propodeal posterior surface with median sulcus that extends to its dorsal margin or nearly so;
– hindwing: crossvein cu-a vertical or anal end closer to wing base than cubital end, jugal lobe not expanded;
– apical tarsomeres without spines on venter and lateral margins;
– claws not elongate, evenly curved, inner and outer claws in each pair equal in size;
– setae straight (not sinuous or angled apically);
– tergum I without erect setae;
– sternum I without longitudinal carina;
– female flagellum round in cross section, without specialized sensory areas;
– female scutum and scutellum not flattened;
– female forefemoral venter minutely, closely punctate;
– female foretibia densely, uniformly punctate throughout (or at most punctures insignificantly sparser on the outer surface);
– female midtrochanteral venter: punctures about one diameter apart;
– female midfemoral venter evenly curved from base to apex, with appressed setae;
– female tarsomeres IV: length greater than width; apicoventral margin emarginate;
– female tarsomeres V without spines on venter or lateral margins;
– female pygidial plate with well-defined marginal carina;
– male flagellomere I: dorsal length equal to 0.8–1.0 of II, ventral length greater than apical width;
– male flagellomere III: dorsal length equal to about 0.9 of IV;
– male forefemoral notch of medium size;
– male tergum VII with punctures about one diameter apart or less;
– male sterna densely, evenly punctate and setose, without setal fringe; and
– male sternum VIII evenly emarginate apically.

***Tachysphex aburi* Pulawski, sp. nov.**
Figures 5–6.

Derivation of name.— *Aburi*, a locality in Ghana where the holotype was collected; a noun in apposition.

Recognition.— The female of *aburi* has a mesally depressed scutellum, the depression contrasting with the surrounding surface by its finer and denser punctures (Fig. 5c), the dorsoapical emargination of mid- and hindtarsomeres IV is about rectangular, and the apical tarsomeres and claws are not unusually elongate (Fig. 5d). The scutellum is similar in many *harpax*, in which the dorsoapical emarginations of mid- and hindtarsomeres IV are rounded proximally (Fig. 179a) rather than angulate and in the vast majority of specimens the apical tarsomeres and claws are elongate, the length of the arolium being equal to about one third of a claw (Figs. 179b, c).

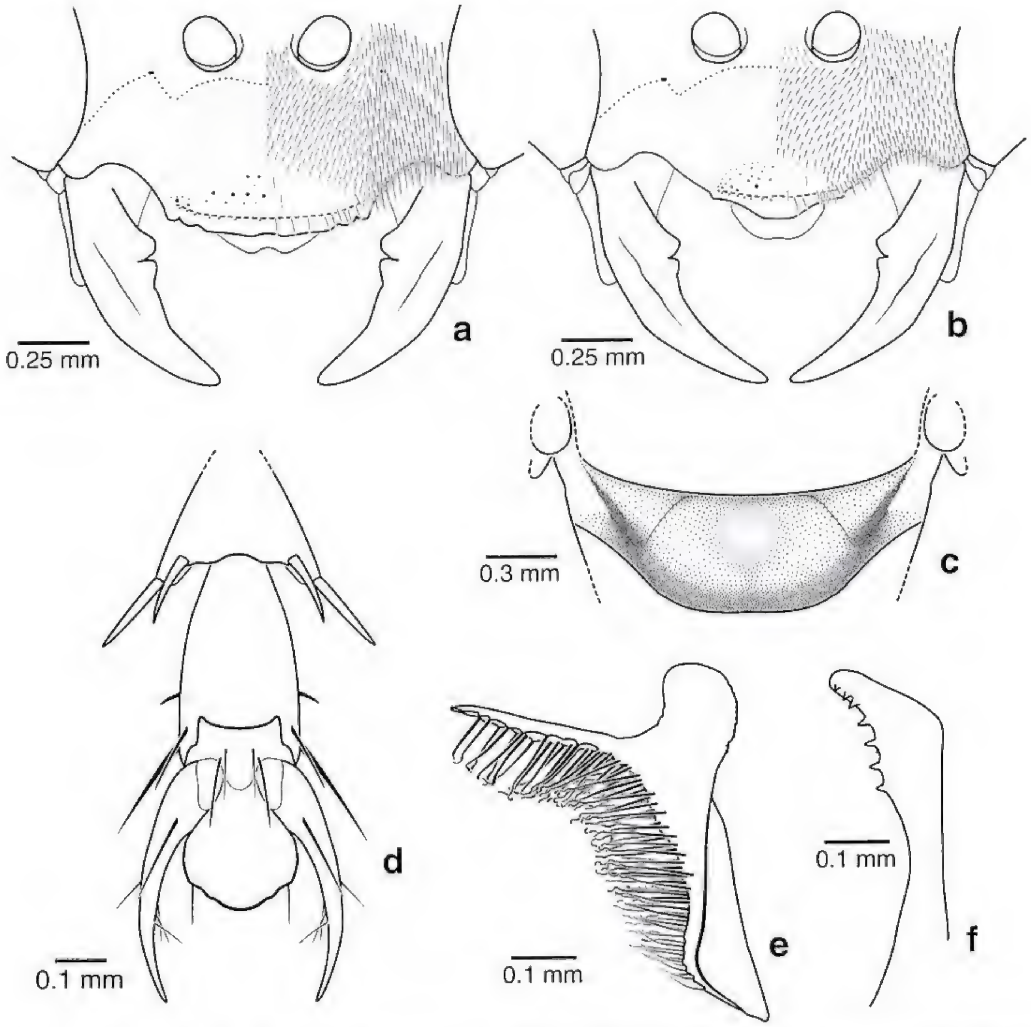

Figure 5. *Tachysphex aburi* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – female scutellum, d – venter of female apical hindtarsomere; e – volsella; f – penis valve.

The male of *aburi* closely resembles *harpax* in having most setae of the labrum free margin stout and short (as in Fig. 178c), punctures of the clypeal lobe becoming sparser toward the lip, and setae appressed on the postocellar area and scutum. They differ only minimally: the venter of each apical tarsomere has one or two small preapical spines in *aburi*, but 2–10 such spines in *harpax*. Their geographic distributions help in identification: *aburi* occurs in West Africa (Ivory Coast to Ghana), whereas *harpax* ranges from Israel, Syria, and Nigeria to Kenya and South Africa. Subsidiary recognition characters of *aburi* are: trimmal carina of mandible with tooth and cleft; tibiae red; propodeal side finely rugose to partly ridged; and setae of propodeal dorsum oriented obliquely posterad and joining apicomesally except basomedian setae pointing toward the head.

Description.— Labrum slightly protruding from below clypeus, most setae emerging from its free margin unusually stout and short (as in Fig. 178c). Scutal punctures fine, averaging no more than one diameter apart. Mesopleuron dull, evenly microsculptured. Propodeal dorsum finely rugose to partly ridged (median ridges longitudinal, other irregular); side ridged but ridges evanescent in many males. Hindcoxal dorsum with inner margin carinate basally.

Setae straight, appressed on postocellar area, scutum, and midfemoral venter; on propodeal dorsum oriented anterolaterad on triangular, basomedian zone, remaining setae pointing posterolaterad to posterad. Setal length about one midocellar diameter on each side of oral fossa next to occipital carina.

Head and thorax black, mandible reddish mesally; pronotal lobe yellowish posteriorly in male. Frontal setae silvery in female; all cephalic and thoracic setae golden in male. Wing membrane slightly infumate; forewing costal vein brown, subcostal vein dark brown to black. Legs black in female (tarsal apex brown); male femora black except red apically, tibiae and tarsi red or tarsal apex dark brown. Gaster black or (some males) terga I and II red mesally. Terga I–III or I–IV silvery fasciate apically in both sexes.

♀.— Labrum broadly emarginate mesally. Clypeus (Fig. 5a): bevel longer than basomedian area; lip slightly arcuate, with two lateral incisions on each side. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.6 × apical width. Scutellum largely depressed mesally, with punctures finer and denser than on surrounding area (Fig. 5c). Forefemoral venter microsculptured, dull, with dense, minute punctures. Dorsal foretibial surface with one preapical spine, outer surface with two spines. Forebasitarsus with nine or 10 rake spines. Tarsomeres IV with dorsoapical emargination nearly rectangular; apical width of hindtarsomere IV about equal to length, apicoventral margin almost straight. Apical tarsomeres not angular basally; with short, erect setae but no spines on venter; with 1–3 small spines near midlength of each lateral margin; and apicoventral margin slightly convex (Fig. 5d). Apical depression of tergum V impunctate, glabrous. Length 9.0–9.8 mm.

♂.— Mandible: trimmal carina with tooth and cleft or with two teeth separated by cleft. Clypeus (Fig. 5b): bevel longer than basomedian area; lip free margin sinuate, with well-defined corner that is prominent in some specimens; distance between corners 1.0–1.1 × distance between corner and orbit. Width of posto-

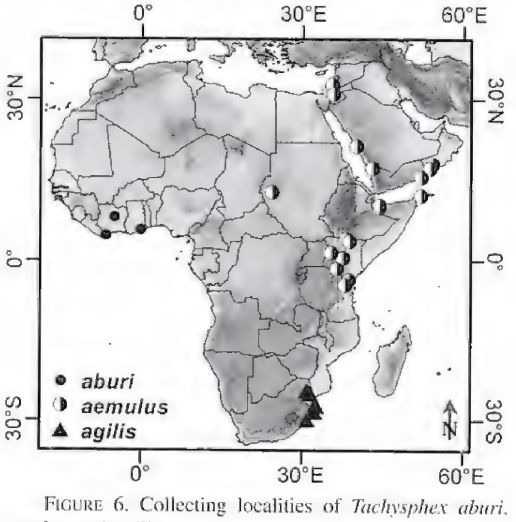

Figure 6. Collecting localities of *Tachysphex aburi*, *aemulus*, and *agilis*.

cellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.2–1.3 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with one or two preapical spines. Sternum VIII tridentate apically. Length 7.0–8.5 mm. Volsella and penis valve: Figs. 5e, f.

GEOGRAPHIC DISTRIBUTION (Fig. 6).— Ivory Coast to Ghana.

RECORDS.— HOLOTYPE: ♀, **GHANA**: Aburi ca 35 km N Accra, 26 Jan 1991, WJP (CAS). PARATYPES: **GHANA**: same locality as holotype, WJP, 26 Jan (4 ♀, 3 ♂) and 10 Feb 1991 (1 ♂). **IVORY COAST**: 50 km N Bouaké, 10 Jan 1991, AM (1 ♀, MSNT) and WJP (1 ♀); 10 km N San Pédro, 18 Jan 1991, WJP (4 ♂).

Tachysphex aemulus Kohl

Figures 6–8.

Tachysphex aemulus Kohl, 1906:216, ♀, ♂. Lectotype: ♂, Yemen: Abd el Kuri Island (NHMW), **here designated**, examined.— Bohart and Menke, 1976:272 (listed); Dollfuss, 1989:13 (type material in NHMW).

Tachysphex liriformis tenax Pulawski, 1971:311, ♀, ♂. Holotype: ♀, Israel: Jerusalem (originally H. Bytinski-Salz collection, now Tel Aviv University), examined before 1971. **New synonym**.— de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Bohart and Menke, 1976:274 (listed); Guichard, 1980:227 (Oman).

RECOGNITION.— *Tachysphex aemulus* has a convex labrum that conspicuously protrudes beyond the clypeal free margin, elongate galea (length equal to 1.0–1.1 of scape), nonfasciate terga (at most terga I–III with evanescent, inconspicuous fasciae), postocellar area and tergum I with appressed, inconspicuous setae, and wing membrane yellowish. In the male, the forebasitarsus has no preapical spines on the outer margin (most specimens) or has only one such spine near midlength, the outer apical spine of foretarsomere II is shorter than this tarsomere's width, the clypeal lobe is narrow (distance between lip corners about 0.7 of distance between corner and orbit), and the dorsal volsellar process is narrow, broadening toward the apex (Fig. 8b).

The species closely resembles *gracilicornis*, *chephren*, *liriformis* Pulawski (Israel to Tajikistan, not included in this revision), and *notogoniaeformis*. In *aemulus*, however, the propodeal dorsum has a characteristic setal pattern: the setae are longer than midocellar diameter and oriented anterad or anterolaterad on a large, triangular area (Fig. 8a), and in addition the propodeal side is not ridged, the gaster and tibiae are red (gastral tip brown in many males), and so are the femora of most specimens. In the other four species, the dorsal propodeal setae are either oriented posterad (except basally), about half as long as the midocellar diameter, or (*chephren*) oriented anterad on a narrow, median zone (the propodeal dorsum is asetose apicomesally in *liriformis* and *notogoniaeformis*); the propodeal side of many specimens is all or partly ridged; the gaster is all black in *chephren* (tergum II reddish basally in some specimens), *notogoniaeformis*, and most *liriformis*; the femora are black (all or partly red in some *liriformis*); and the tibiae are black in *chephren*, *notogoniaeformis*, the females of *gracilicornis* and *liriformis* (all or largely so), and in most males of these latter two species. In *notogoniaeformis*, the dorsal volsellar process is markedly broader than in *aemulus* (compare Figs. 8b and 258c).

JUSTIFICATION OF NEW SYNONYMY.— *Tachysphex aemulus* agrees with *liriformis tenax* in all characters and is obviously conspecific. These two names are therefore synonyms.

STATUS OF *TACHYSPHEX LIRIFORMIS*.— In 1971, I described *Tachysphex liriformis* with two subspecies: *liriformis liriformis* and *liriformis tenax* because the two phenotypes were allopatric (nearly overlapping in Israel) and because variation in their characters (mainly color) suggested full intergradation. A newly discovered difference in the propodeal setation, inconspicuous at first but constant, demonstrates that they are discrete species.

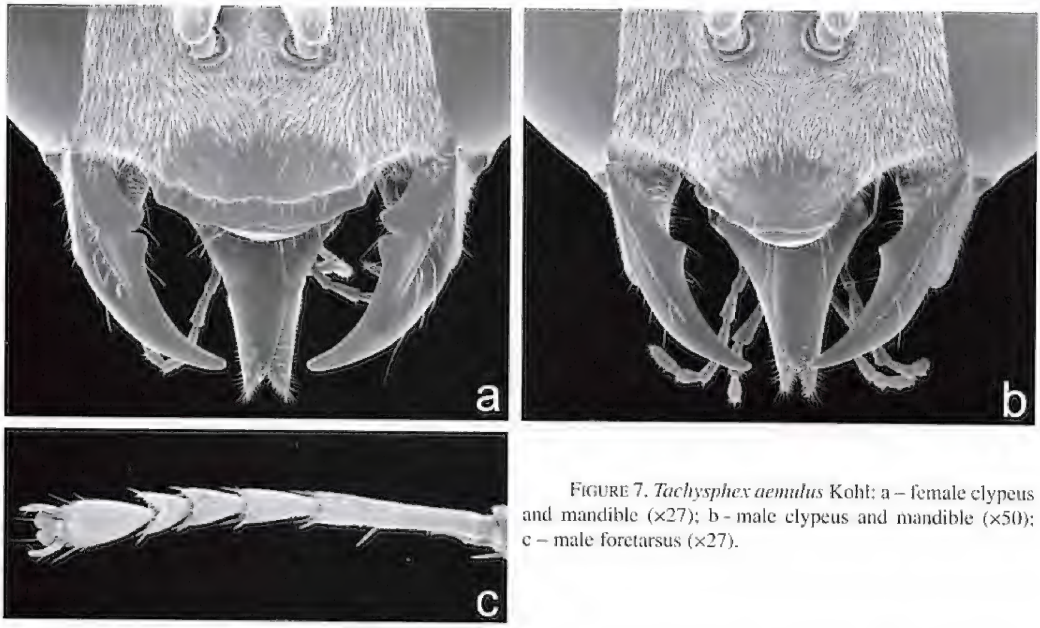

FIGURE 7. *Tachysphex aemulus* Koht: a – female clypeus and mandible (×27); b - male clypeus and mandible (×50); c – male foretarsus (×27).

SIMILAR UNASSIGNED SPECIMEN.— One of the two syntypes from Cape Ras Fartak, Abd el Kuri Island, is identical morphologically to the other specimens examined in all pertinent characters (including the shape of the volsella), but differs in having an all black gaster, femora, and tibiae (foretibial inner surface reddish) and conspicuous setal fasciae on terga I–III; also, the setal triangle on the propodeal dorsum with setae oriented anterad is narrower. This specimen may be an aberrant *aemulus* or another species, but neither possibility can be ascertained without additional material.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea with punctures less than one diameter apart except several diameters apart near apex, as long as 1.0–1.1 of scape. Scutum dull, microsculptured, with minute, inconspicuous punctures that average less than one diameter apart. Mesopleuron, propodeal dorsum, and propodeal side evenly microareolate. Hindcoxal dorsum with inner margin carinate basally.

Setal length about 0.3 × basal mandibular width on each side of oral fossa next to occipital carina; setae appressed on postocellar area and scutum; oriented anterolaterad on propodeal dorsum except oriented posterad laterally (lateral setae join apicomesally in Arabian and Jordanian specimens).

Head and thorax black, mandible yellowish red except black apically, clypeal bevel red in some females. Frontal setae silvery in female, golden in male. Wing membrane yellowish; both costal and subcostal veins of forewing reddish. Femora mostly red, but black in some Israeli specimens; tibiae and tarsi red. Gaster red except up to three apical segments dark in some males. Terga not fasciate or terga I–III each with ill-defined, golden fascia apically.

♀.— Clypeus (Fig. 7a): bevel slightly shorter to slightly longer than basomedian area; lip free margin arcuate, emarginate mesally, shallowly concave laterally. Width of postocellar area 0.5–0.6 × length. Dorsal length of flagellomere I 3.2–3.4 × apical width. Foretibial outer surface with two spines. Forebasitarsus with 6–8 rake spines. Tergum V uniformly micropunctate and setose throughout or apical depression glabrous apicomesally. Pygidial plate with minute punctures that

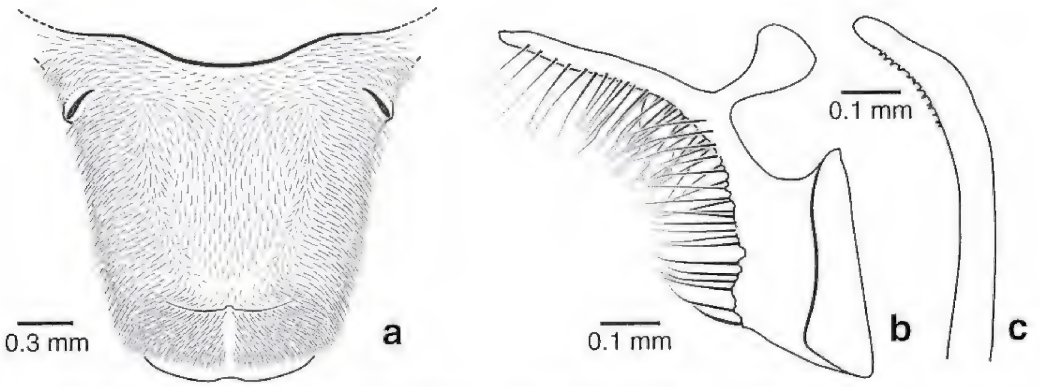

FIGURE 8. *Tachysphex aemulus* Kohl: a – propodeal dorsum showing orientation of setae; b – volsella; c – penis valve.

are several diameters apart; interspaces mostly microsculptured, dull, but unsculptured, shiny in some Israeli specimens. Length 9.5–13.8 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 7b): bevel shorter to longer than basomedian area, delimited laterally by oblique carina emerging from lip corner; lip free margin arcuate, in many specimens shallowly emarginate mesally; corner varying from well defined to ill defined; distance between corners 0.7 × distance between corner and orbit. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 2.5–2.7 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines in most specimens, but with one such spine near midlength in some (Fig. 7c); outer apical spine of foretarsomere II shorter than this tarsomere's width. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Length 6.4–11.0 mm. Volsella and penis valve: Figs. 8b, c.

GEOGRAPHIC DISTRIBUTION (Fig. 6).— Israel, Jordan, Arabian Peninsula to Ethiopia, Kenya, and Tanzania.

RECORDS.— **ETHIOPIA**: **Sidamo**: 26 km N Moyale (5 ♀, 14 ♂; 1 ♂, AAU), 35 km N Moyale (1 ♀), 120 km N Moyale (1 ♂). **ISRAEL**: (from Pulawski, 1971, when the number of specimens examined is not indicated): En Gedi on Dead Sea, Jerusalem (1 ♀, 2 ♂, paratypes of *tenax*), Jiftlik in Jordan Valley 22 km E Nablus, Masada, Tiberias. **JORDAN**: Dhat Ras at 31°00.0′N 35°46.0′E (3 ♂, RMNH). **KENYA**: **Coast Province**: Taita Discovery Centre: Galla Hill area (2 ♂). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♂), 5 km NNE Isiolo (1 ♀, 16 ♂). **Rift Valley Province**: Magadi road 46 air km SW Nairobi (5 ♂), Marich Pass Field Studies Centre (1 ♀), Olorgesailie (1 ♂). **OMAN**: **Dhofar** (in Quara Mountains, or Jabal Qara): Ain al Rizat, also spelled Ain Arzat (Pulawski, 1971), Ayun pools (Guichard, 1980). **SAUDI ARABIA**: Fayfa (1 ♀, KMG), Wadi Majarish below Taif (1 ♂, KMG). **SOMALIA**: Bio Dia [probably Biyo Dai at 9°55′N 44°20′E] (1 ♀, BMNH), Bulhar (1 ♂, BMNH). **SUDAN**: **Darfur**: Karanga in Gebel Murra (1 ♀, BMNH). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe (1 ♀, 17 ♂; 2 ♂, UCD; 2 ♂, UDS), 2 km NE Mkomazi (4 ♂), Pangani River Camp 86 km NW Korogwe (1 ♂). **YEMEN**: Abd el Kuri Island between Socotra and Somalia: no specific locality (1 ♀, 2 ♂, NHMW, lectotype and paralectotypes of *aemulus*), Abd el Kuri Island: Jebel Saleh (1 ♂, BMNH), Cape Ras Fartak (1 ♂, NHMW, paralectotype of *aemulus*).

Tachysphex aethiopicus Arnold

Figures 9–11.

Tachysphex panzeri var. *aethiopicus* Arnold, 1923:167, ♀, ♂. Lectotype: ♂, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae); nec Arnold, 1951:157 (= ?); Hancock, Chahwanda, and Mhlanga, 1995:40 (syntype in Bulawayo Museum).— As

Tachysphex aethiopicus: Pulawski *in* Bohart and Menke, 1976:272 (new status); Gess, 1981:19 (South Africa; nesting in friable soils); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Recognition.— *Tachysphex aethiopicus* has a convex labrum (markedly protruding beyond the clypeal free margin), galea about as long as the scape, upper metapleural pit oblong, propodeal side ridged (ridges present only anteriorly in some specimens), setae straight on the head and thorax (appressed on the postocellar area), diverging obliquely anterad from the midline on the propodeal dorsum, and male sterna V and VI each with a subbasal, erect fringe of agglutinated setae (fringes visible only when the sterna are fully extended).

The female of *aethiopicus* has foretarsomeres I–III slightly broadened apicolaterally, with the lateral margin expanding over the bases of the rake spines (Figs. 9c, e). *Tachysphex melanius*, *miniatulus*, *rotundus*, *ruber*, and *usakos* are similar, but *aethiopicus* has the following combination: clypeal lip emarginate mesally (barely emarginate in *rotundus*, not emarginate in *ruber*), foretarsal rake pale to moderately dark (black or dark brown in *rotundus*), gaster red basally and black apically (all black in *melanius*, all red in *ruber*), and the pygidial plate shiny, unsculptured between the punctures, not downcurved apically (dull, uniformly microsculptured in *rotundus*, at least apically so, downcurved apically in *ruber*). In addition, the clypeus is partly yellow in the vast majority of specimens (all black in *melanius, miniatulus*, and *rotundus*). Females of *aethiopicus* and *usakos* can be distinguished only with some difficulty. In *aethiopicus* (widely distributed in sub-Saharan Africa), the clypeal bevel is shorter than the basomedian area, the width of postocellar area is 0.9–1.0 × length, the dorsal length of flagellomere I is 2.2–2.6 × apical width, and the scutum is dull, with punctures compressed against each other. In *usakos* (Namibia), the clypeal bevel is mostly longer than the basomedian area, but shorter in some specimens, the width of the postocellar area is 1.2–1.3 × length, the dorsal length of flagellomere I is 2.8–3.2 × apical width, and the scutal punctures on disk average one diameter or more apart (interspaces mostly shiny). Most but not all females of *aethiopicus* can be recognized by the dense clypeal punctation that extends to the lip base laterally.

The male has foretarsomere II somewhat expanded apicolaterally over the bases of the rake spines (Figs. 9d, f), and subsidiary recognition characters are: clypeal lobe broad (distance between corners 1.1–1.3 × distance between corner and orbit); dense clypeal punctation extending to lip base (except mesally in most specimens); clypeal bevel dull, with microsculptured interspaces (as in *rotundus*); clypeal lip emarginate mesally (not emarginate in *ruber*); and forefemur emarginate, the emargination asetose (forefemur entire in *rotundus*, with bottom of emargination setose in *ruber*).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, sparsely punctate, as long as 0.9 of scape. Scutal punctures minute, appressed against each other (scutal surface dull). Mesopleural punctures minute, about one diameter apart. Propodeal dorsum uniformly microsculptured, side ridged (ridges fine in some specimens, present only anteriorly in others); upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally, but carina evanescent.

Setae appressed on postocellar area, about one midocellar diameter long on each side of oral fossa next to occipital carina; appressed on scutum (no longer than one midocellar diameter); on propodeal dorsum diverging obliquely anterad from midline, but pointing laterad on sides; practically appressed on midfemoral venter.

Head and thorax black, but the following yellowish red: mandible (except apically), clypeal bevel and lip, labrum, and pronotal lobe, except clypeal bevel and pronotal lobe all black in some specimens from South Africa. Frontal setae golden in both sexes (except silvery ventrolaterally), silvery in ventral half in males from Zanzibar. Wing membrane slightly infumate, costal vein of

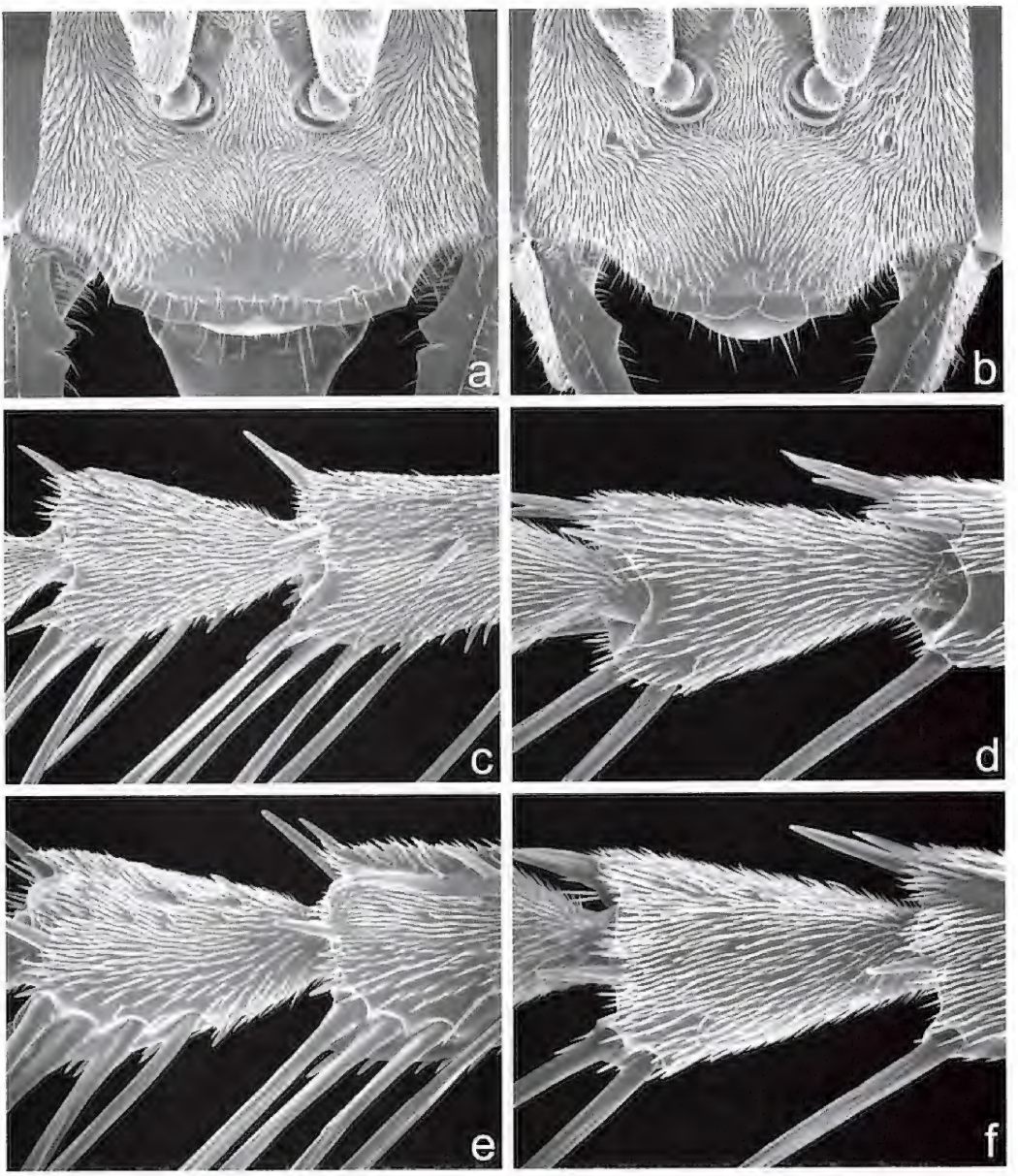

FIGURE 9. *Tachysphex aethiopicus* Arnold: a – female clypeus (×27); b – male clypeus (×63); c – apex of female foretarsomere I and foretarsomere II, dorsal view (×90); d – apex of male foretarsomere I and foretarsomere II, dorsal view (×180); e – apex of female foretarsomere I and foretarsomere II, ventral view (×90); f – apex of male foretarsomere I and foretarsomere II, ventral view (×180).

forewing light brown, subcostal vein dark brown. Femora red, black dorsally except near apex (dorsum black only basally in some specimens). Tibiae and tarsi red. Gastral segments I–III red and remainder black in most specimens, but tergum III largely black in some; gaster nearly all black in one male from Bathurst and single male from Colchester, South Africa, and all black in males from

60 km N Cape Town and Hondeklipbaai area. Terga I–IV or I–V in female, I–V or I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 9a): bevel shorter than basomedian area; dense clypeal punctation, in most specimens, reaching lip base laterally; lip emarginate mesally, not sinuous laterally. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 2.4–2.6 × apical width. Foretibial outer surface with two spines. Foretarsomeres I–III slightly expanded apicolaterally over bases of rake spines (Figs. 9c, e). Forebasitarsus with 6–8 (mostly 6) rake spines. Apical depression of tergum V microsculptured, setose in fresh specimens. Pygidial plate: apical margin truncate or shallowly concave; punctures minute, averaging many diameters apart, interspaces unsculptured or alutaceous. Length 8.7–9.1 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 9b): bevel microsculptured, dull, about as long as basomedian area; dense clypeal punctation extending to lip base (only laterally so in most specimens); lip free margin straight or minimally concave, emarginate mesally in most specimens (not emarginate in a male from Tiwi Beaches, Kenya), with well-defined corner; distance between corners 1.1–1.3 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.4–1.5 × apical width, equal to about 0.7 of that of flagellomere II. Forefemoral notch microsculptured, glabrous. Outer margin of forebasitarsus with four (occasionally five) rake spines. Foretarsomere II slightly expanded apicolaterally over bases of rake spines (Figs. 9d, f), its outer apical spine longer than tarsomere III. Sterna V and VI (except laterally) each with subbasal, erect fringe of agglutinated setae (fringes visible only when segments are fully extended). Sternum VIII broadly, shallowly emarginate apically. Length 6.4–8.5 mm. Volsella and penis valve (Fig. 10).

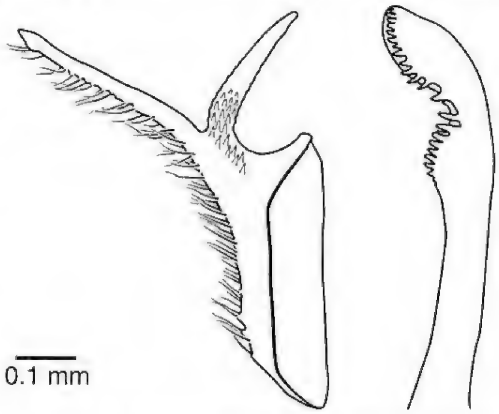

FIGURE 10. *Tachysphex aethiopicus* Arnold: volsella and penis valve.

VARIATION.— In most females, the clypeal lobe is characteristically broad (distance between lip corners equal to 1.4 × clypeal midlength). In a female from Kenton-on-Sea, South Africa, the clypeus is longer, with the same index equal to 1.5. Although these ratios differ by mere 7%, the difference in shape is immediately noticeable when specimens are compared.

PREY.— One female from Fanies Island, South Africa (AMG), is pinned with her prey, an acridid nymph (det. F. W. Gess).

GEOGRAPAHIC DISTRIBUTION (Fig. 11).— Africa south of the equator, also Somalia.

RECORDS.— **ANGOLA**: Cabinda (1 ♀, MCZ). **BOTSWANA**: Lake Ngami 12 mi NE Sehitwa (1 ♂, BMNH), Linyanti Marsh (1 ♂, BALDOCK). **CONGO**: no specific locality (3 ♀, MNHN). **KENYA**: **Coast Province**: Mombasa (1 ♂, USU), Mount Kasigau (1 ♀, 1 ♂), Shimba Hills at 4°09.4′S 39°25.0′E (1 ♀), Tiwi Beaches ca 17 km S Mombasa (5 ♀, 3 ♂; 3 ♂, NMK), 16 km SW Voi (1 ♂), Voi area (12 ♀, 16 ♂, OÖLM), Watamu 20–30 km S Malindi (1 ♂, MSNT), Wundanyi (5 ♂, OÖLM). **MALAWI**: Chiromo (1 ♂, BMNH), Monkey Bay (1 ♀, ZMAN), Mpepwe (1 ♀, ZMAN), Nkhotakota (1 ♀, USU). **MOZAMBIQUE**: Chigubo at 22°50′S 33°31′E (1 ♂, USNM), Inhaca (2 ♀, ZMAN), Maputo (1 ♀, ZMAN). **NAMIBIA**: **Okahandja District**: Okahandja (1 ♂, BMNH). **Rundu District**: Rundu (2 ♀, OHL). **SOMALIA**: Afgoi (1 ♀, RMNH). **SOUTH AFRICA**: **Eastern Cape Province**: Alexandria Forest (1 ♂, AMG), 10 km SE Alexandria (2 ♀; 44 ♀, 17 ♂, OÖLM), Algoa Bay (6 ♀, 3♂, TMP), Andries Vosloo Kudu Reserve 32 km NE Grahamstown at 33°05′S 26°47′E (1 ♂), Bathurst (4 ♀, 10 ♂, AMG), Belmont Valley 10 km E Grahamstown at 33°19′S

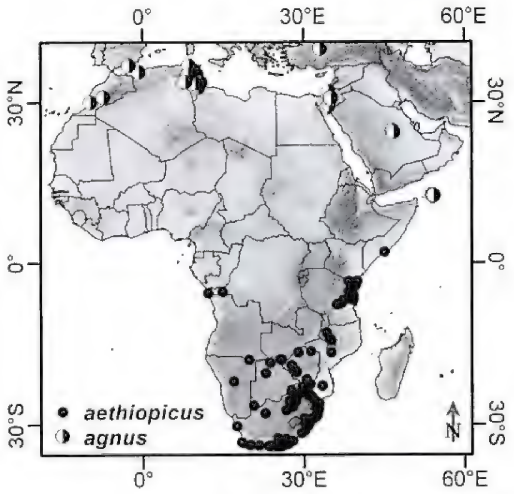

FIGURE 11. Collecting localities of *Tachysphex aethiopicus* and *agnus*.

26°38′E (1 ♀, AMG), Colchester at 33°42′S 25°50′E (1 ♂), East London (1 ♀, ZMAN), Fort Beaufort (1 ♀, 2 ♂, AMG), Gamtoos River mouth (3 ♂, SAM), Hankey (1 ♀, 1 ♂, PPRI), 18 km WNW Grahamstown: Hilton Farm (9 ♀, 2 ♂, AMG; 2 ♀, 2 ♂, PMA), Howison's Poort 6 km WSW Grahamstown (1 ♀, 1 ♂, AMG), Jeffreys Bay (3 ♂, SAM), Kasouga (1 ♀, 1 ♂, AMG), Kenton-on-Sea (1 ♀; 2 ♂, AMG), Pearston (1 ♀, PPRI), Plettenberg Bay (5 ♀, 7 ♂, AMG), Port Alfred (1 ♀, AMG), Port Alfred: Salt Vlei (1 ♀, AMG), Port Elizabeth: Cape Recife (1 ♀, AMG), Port Elizabeth: Walmer (1 ♀, 6 ♂, AMG; 5 ♀, 1 ♂, SAM), Port St. Johns (1 ♂, BMNH; 1 ♂, CU), Rietrivier mouth near Port Alfred (8 ♀, 10 ♂, AMG), Tsitsikama Mts. (1 ♀, BALDOCK), Van Stadens River Mouth at 33°58′S 25°13′E (1 ♀, SAM). **Free State**: Bothaville (1 ♂, AMG). **Gauteng**: Bryanston (2 ♂, AMG), Pretoria (1 ♂, AEI; 1 ♀, AMG), Pretoria: Botanical Garden (1 ♀, 5 ♂; 2 ♂, LEM), Pretoria: Capital Park (1 ♀), Pretoria: Lynnwood at 25°48′S 28°22′E (1 ♂), Pretoria North (1 ♀, AMG; 1 ♀, PPRI), 20 km W Pretoria at Hennops River (1 ♂, PPRI), Tswaing (1 ♂), Vereeniging (1 ♂, AMG), Wapadrand 8 km E Pretoria at 25°48′S 28°22′E (1 ♂). **Kwazulu-Natal**: Durban: Burman Bush (2 ♀, 2 ♂, AMG), Durban: Umbilo (1 ♀, 1 ♂, AMG), 20 km S Emanguzi (3 ♂, OÖLM), SW Emanguzi (4 ♂, OÖLM), Eshowe (1 ♀, BMNH), Fanies Island in Santa Lucia Lake (1 ♀, AMG; 2 ♀, 2 ♂, PPRI), Kosi Bay at 26°58′S 32°48′E (1 ♀, 3 ♂, PPRI), Kuleni Farm near Hluhluve at 27°54′S 32°22′E (2 ♂, PPRI), Lake Santa Lucia: Charters Creek (1 ♂, ZMAN), Mbazwana (3 ♂, OÖLM), Mtunzini 1–1.5 km E Umlalazi Nature Reserve (2 ♀, 1 ♂, PMA), Ndumu Game Reserve at 26°54′S 32°15′E (2 ♂, PPRI), Port Edward (1 ♀, 1 ♂, PPRI), Richmond (1 ♀, OÖLM), Scottburgh (1 ♀, AMG; 1 ♀, KU), Sibaya Lake at 27°22′S 32°43′E (1 ♂, PPRI), Sileza Forest Reserve (1 ♂, CSE), Stanger (1 ♂, AMG), St. Lucia Bay (1 ♂, RMNH), St. Lucia Estuary (1 ♂, AEI), Tembe Elephant Park (1 ♀, OÖLM), Umlalazi Nature Reserve (1 ♀, PMA), Weenen (1 ♂, BMNH). **Mpumalanga**: Crocodile Bridge in Kruger National Park (2 ♂, PPRI), Skukuza in Kruger National Park (1 ♀, 1 ♂, PMA). **Northern Cape Province**: 25 km E Hondeklipbaai (1 ♂, OÖLM), Olifantshoek (1 ♂, AMG), Twee Rivieren in Kalahari Gemsbok National Park at 26°25′S 20°37′E (1 ♀, PPRI). **Northern Province**: Afguns (1 ♀, AMG), Buffelspoort (2 ♂), Buffelspoort Dam (1 ♀, AMG), D'Nyala Nature Reserve (3 ♀, 2 ♂, PPRI), Ellisras (1 ♀, AMG), Guernsey Farm 15 km E (1 ♀, 6 ♂, PMA) and 15 km NW Klaserie (1 ♀, 5 ♂, PMA), Happy Rest Nature Reserve at 22°59′S 29°46′E (1 ♀, PPRI), Klaserie (6 ♂, PMA), Mogol Nature Reserve (2 ♀, 6 ♂, PPRI), Mogoto Nature Reserve near Zebediela (1 ♀, PPRI), 30 km E Nylstroom (2 ♀, PMA), Pafuri in Kruger National Park (2 ♀, 5 ♂, PPRI), Swadini in Blydepoort Nature Reserve at 24°32′S 30°54′E (2 ♂, PPRI), 5 mi N Warmbad (4 ♂; 1 ♀, USNM). **North-West Province**: Rustenburg: Meyjes' Farm (1 ♂, AMG). **Western Cape Province**: Ashton (1 ♂, OÖLM), 60 km N Cape Town (1 ♂; 2 ♂, OÖLM), Langberg (2 ♂, OÖLM). **TANZANIA**: **Dar es Salaam Region**: Bahari 30–35 km NW Dar es Salaam (1 ♀, MSNT), Dar es Salaam (2 ♀, MSNT). **Iringa Region**: 75 km ENE Iringa (1 ♀, 1 ♂). **Morogoro Region**: 3 km S Mikumi (6 ♀, 3 ♂; 2 ♀, DSU), Morogoro (1 ♀, KU; 3 ♀, MCZ), 48 road km W Morogoro (3 ♂), Ruaha River bank 7 km S Mikumi (3 ♀, 3 ♂; 1 ♀, 1 ♂, UCD). **Tanga Region**: 11 km SW Korogwe at 5°14.2′S 38°24.7′E (2 ♂). **Zanzibar Region**: Unguja (= Island of Zanzibar): airport (4 ♀, 4 ♂, MSNT), Fuoni (1 ♂, MSNT), near Mazi Moja (1 ♀, BMNH), Mazizini (1 ♂, RMNH), Zanzibar City (1 ♀, 1 ♂; 1 ♀, 1 ♂, KMG). **ZAIRE**: **Zaïre Central**: Mbanza Ngungu (2 ♂). **ZAMBIA**: **Southern Province**: 30 km W Livingstone (1 ♂, OÖLM), Victoria Falls (1 ♂). **ZIMBABWE**: Bubye River 80 km NE Beit Bridge (10 ♀, 3 ♂, OÖLM), Bulawayo (1 ♀, 1 ♂, AMNH; 1 ♀, 1 ♂, PPRI; 1 ♀, TMP), Bulawayo: Hillside (1 ♂), Charara 20 km ESE Kariba (4 ♀, 2 ♂), Kami Ruins (2 ♂), Lupane (1 ♀, OÖLM), Mavuradonha Wilderness area 15 km E Muzarabani (2 ♂, OÖLM), 7 km WSW Nyamandhlovu at Kami River (1 ♂), 11 km NE Nyamandhlovu

(1 ♂), Redbank at Kami River (1 ♀, 16 ♂; 4 ♂, NHMZ; 4 ♂, NMN), Sawmills (1 ♀, 1 ♂, CU; 2 ♀ paralectotypes, 1 ♂ lectotype of *aethiopicus*, SAM; 1 ♀, TMP), Sawmills at Umguza River (1 ♂), Victoria Falls (6 ♀, 27 ♂; 8 ♂, NHMZ).

Tachysphex agilis (F. Smith)

Figures 6, 12.

Tachytes agilis F. Smith, 1856:301, ♂. Holotype or syntypes: ♂, South Africa: Kwazulu-Natal: Port Natal, now Durban (BMNH), examined.— Radoszkowski, 1881:210 (Angola, probably in error); Dalla Torre, 1897:686 (in catalog of world Hymenoptera).— As *Tachysphex agilis*: R. Turner, 1917d:43 (new combination); Arnold, 1923a:175 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed).

Recognition.— The female of *agilis* is characterized by the tarsal shape and proportions: tarsomeres IV wider than long, with dorsoapical emargination widely obtuse, almost straight; apicoventral margin of tarsomeres III and IV projecting or at least convex mesally; tarsomeres V angulate basoventrally, each with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe; and on each leg one claw smaller than the other. Other species share these characteristics, but only *agilis*, *silvestris*, and *suavis* have sparse foretarsal rakes, with only 5–7 rake spines on the forebasitarsus (of which only apical two and exceptionally three have their sockets confluent); also, the mesopleural punctures are minute, ill defined. *Tachysphex agilis* differs from the other two species in having largely red tibiae (for other differences with *suavis* see the latter species, p. 604).

The male has an all black gaster (sternum VIII red), at least the hindtibia red, a preapical cluster of minute spines on the venter of apical tarsomeres, propodeal side ridged, and setae straight on the head and thorax. A number of species share these characteristics, but *agilis* differs in having a flat clypeal middle section (basomedian area and bevel not differentiated) and the setae erect or suberect on the scutum anteriorly and all erect or oriented posterad on the propodeal dorsum (rather than oriented anterad). It also has a moderately long flagellomere I (ventral length more than apical width, while less than apical width in *argentifrons*) and simple apical tarsomeres (lateral margin obtusely expanded in *hippolyta*).

Description.— Mandible: outer ridge somewhat swollen and expanded over notch. Scutal punctures averaging about 2–3 diameters on disk; interspaces microsculptured but somewhat shiny. Mesopleuron microsculptured, dull, with minute, ill-defined punctures that are many diameters apart. Propodeal dorsum irregularly ridged longitudinally to irregularly rugose (ridges evanescent in smallest males); side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect, angled apically, on each side of oral fossa next to occipital carina (setal length about 0.4 × basal mandibular width); erect on postocellar area, erect or suberect on scutum anteriorly, and about as long as midocellar diameter; erect or oriented posterad on propodeal dorsum.

Head and thorax black, mandible reddish preapically. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal and subcostal veins of forewing brown. Femora black in female and some males, other males with midfemur all black or red apically and hindfemur all red or black in basal half. Female foretibia black (reddish on inner surface), midtibia red except black in basal third or so, hindtibia red; male tibiae red or fore- and midtibia black except red apically. Tarsi red. Gaster black, male sternum VIII red. Terga I–III silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 12a): middle section not differentiated into bevel and basomedian area, with punctures fine basally and large apically, with microsculptured, dull interspaces; lip free margin arcuate, shallowly emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 1.9 × apical width. Scutum and scutellum flattened. Dorsal foretibial surface without spines, outer surface with

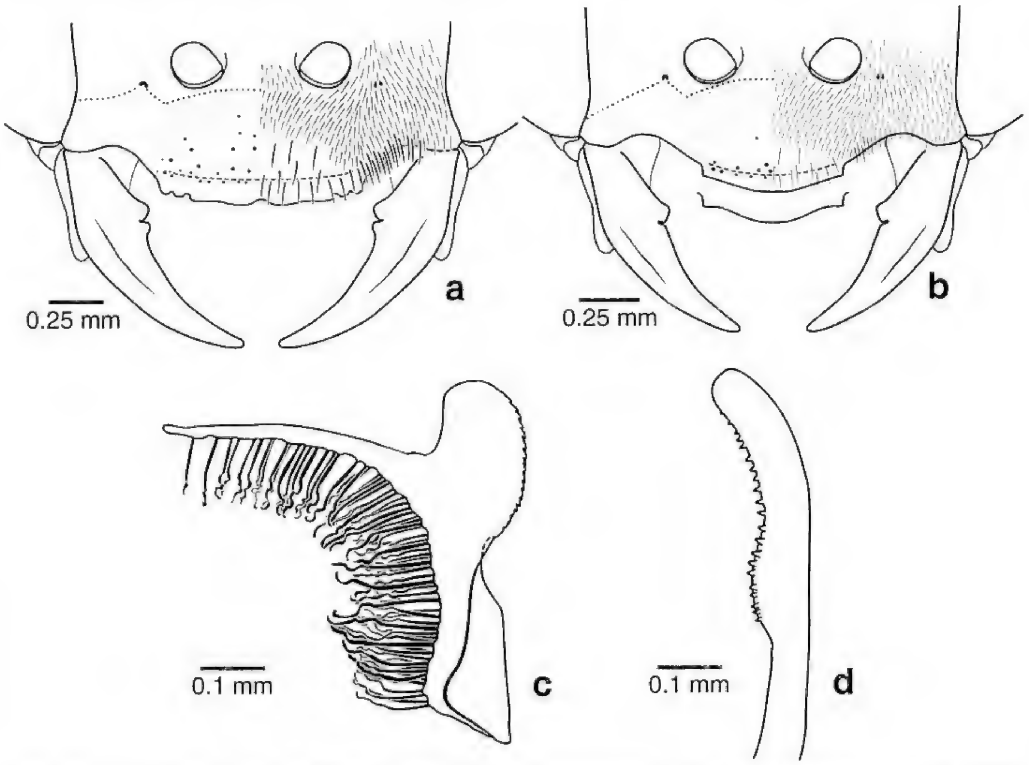

FIGURE 12. *Tachysphex agilis* (F. Smith): a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

one erect seta near midlength. Forebasitarsus with six rake spines; two apical spines with sockets confluent; foretarsomere II with three rake spines (two apical ones, with sockets nearly confluent, one near midlength). Outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres III and IV with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical margin very broadly emarginate (almost straight). Tarsomeres V angulate basoventrally, venter with central cluster of small spines; each lateral margin with row of minute spines subbasally; apicoventral margin produced into lobe. Outer claw in each pair shorter and thinner than inner claw (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that average several diameters apart; interspaces almost unsculptured. Length 8.8 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 12b): middle section flat, bevel and basomedian area not differentiated; lip free margin arcuate or sinuate, with well-defined corner; distance between corners 1.0–1.2 × distance between corner and orbit. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.4–1.5 × apical width. Forefemoral notch with bottom microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Venters of tarsomeres V each with preapical cluster of minute spines. Length 6.4–7.6 mm. Volsella and penis valve: Figs. 12c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 8).— Eastern South Africa from Durban to Kruger National Park. Radoszkowski's (1881) record from Angola is almost certainly a misidentification.

COLLECTING PERIOD.— 7–13 November, 12–31 December, 14–20 January.

Records.— SOUTH AFRICA: Kwazulu-Natal: Durban (1 ♂, BMNH, holotype or only surviving syntype of *agilis*), Lake Sibai (1 ♀, AMG), St. Lucia Estuary (2 ♂; 3 ♂, AEI; 1 ♂, PMA), Tembe Elephant Park (1 ♂; 1 ♂, OÖLM). **Mpumalanga**: Skukuza in Kruger National Park (1 ♂). **Northern Province**: Guernsey Farm 15 km E Klaserie (1 ♂, PMA), Guernsey Farm 15 km NW Klaserie (1 ♂, PMA).

Tachysphex agnus Pulawski

Figures 11, 13.

Tachysphex agnus Pulawski, 1971:152, ♀, ♂. Holotype: ♀, Tunisia: Djerba (RMNH), examined before 1971. — de Beaumont, Bytinski-Salz, and Pulawski, 1973:8 (Israel); Bohart and Menke, 1976:272 (listed); Dollfuss, 1989:13 (paratype in NHMW).

Recognition.— *Tachysphex agnus* is an all black species that occurs north of the equator and has well-defined mesopleural punctures, setae erect on the postocellar area, nearly so on the scutum anteriorly, suberect on midfemoral venter (longest setae about equal to one midocellar diameter), and inclined obliquely anterad on the propodeal dorsum. Additionally, it has a flat, nonemarginate labrum, galea in profile shorter than wide, punctatorugose frons, and unspecialized tarsi (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venters or lateral margins). In the female, the free margin of the clypeal lip is neither projecting mesally nor incised laterally, and the middle clypeal section is convex, with the bevel slightly shorter to slightly longer than basomedian area. In the male, the clypeal lip is pointed, without corners, and the forebasitarsus has no preapical rake spines. Unlike similar species (*nitidior, nitidissimus, nitidus, tarsinus*), the setae of *agnus* are sinuous at least on the postocellar area and on the mesopleuron anteriorly, and in many specimens also on the lower gena (adjacent to hypostomal carina) and midfemoral venter.

Similar unassigned specimens.— A pair of specimens from United Arab Emirates (KMG) closely resembles *agnus*, but the costal vein of the forewing is pale yellowish, and the foretarsal rake is conspicuously developed in the male.

Description.— Scutal punctures well defined, about one diameter apart. Mesopleural punctures well defined, less than one diameter apart or some punctures beneath scrobe up to 2–3 diameters apart. Propodeal dorsum rugose and with longitudinal, irregular ridges; side ridged. Hindcoxal dorsum with inner margin carinate.

Setae sinuous on postocellar area and mesopleuron (at least anteriorly), in most specimens also adjacent to hypostomal carina and on midfemoral venter, in some also on scutum anteriorly, inclined obliquely anterad on propodeal dorsum. Setal length expressed as a fraction of basal mandibular width: 0.5–0.6 on postocellar area, 0.4–0.5 on each side of hypostomal carina next to occipital carina; longest setae of midfemoral venter about one midocellar diameter long.

Head, thorax, gaster, and legs black, mandible reddish at about two thirds of length (almost black in most specimens). Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal vein of forewing brown, subcostal vein black. Terga I–III (I–IV in males from Socotra) silvery fasciate apically.

♀.— Clypeus (Fig. 13a): bevel shorter to longer than basomedian area; lip free margin arcuate, without median notch or lateral incision. Width of postocellar area 1.4–2.1 × length, but 1.3 in those from Saudi Arabia and 1.0–1.2 × in those from Socotra. Dorsal length of flagellomere I 2.2–2.5 × apical width. Dorsal foretibial surface with one spine, outer surface with two spines. Forebasitarsus with 6–8 rake spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that average several to many diameters apart, interspaces varying from unsculptured to aciculate. Length 8.5–10.0 mm.

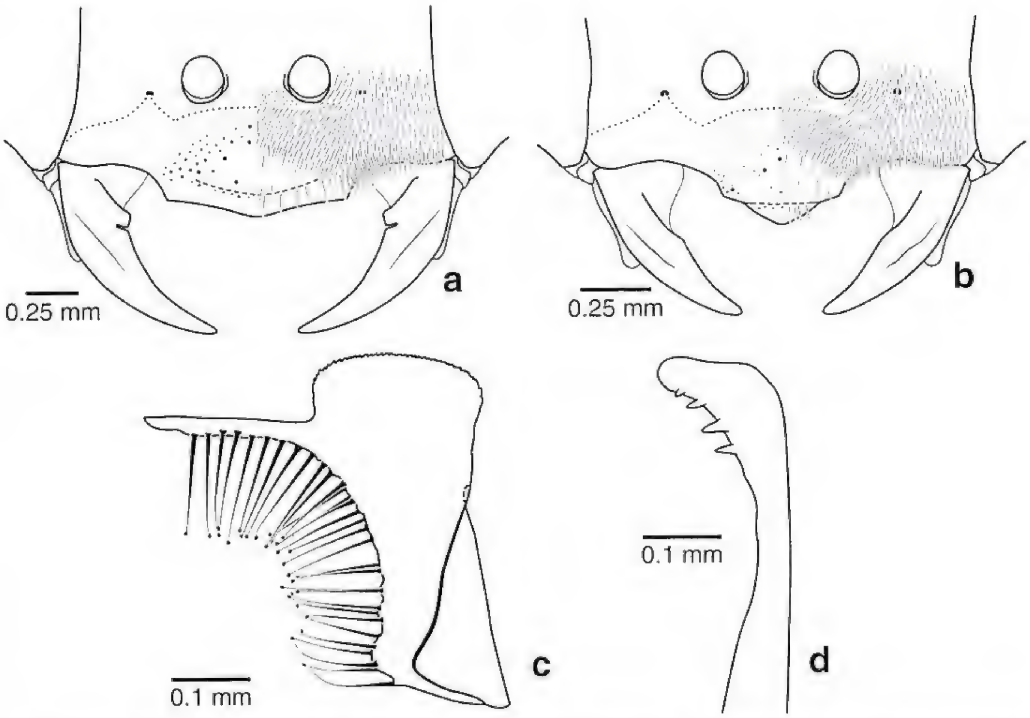

FIGURE 13. *Tachysphex agnus* Pulawski: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 13b): bevel shorter than basomedian area; lip free margin pointed, without corner (but bevel with oblong tubercle adjacent to margin); distance between tubercles 0.9–1.1 × distance between tubercle and orbit. Width of postocellar area 1.5–1.8 × length. Dorsal length of flagellomere I 1.2–1.4 × apical width. Forefemoral notch with bottom microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III, about as long as inner spine. Length 6.4–7.5 mm. Volsella and penis valve: Figs. 13c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 11).— Southern Spain, Morocco to Tunisia, Sinai Peninsula, Israel, Turkey, Arabian Peninsula, Island of Socotra.

RECORDS.— ALGERIA: Oran (Pulawski, 1971). **EGYPT**: **Sina** (= Sinai): Nuweiba at 29°03′N 34°33′E (1 ♀, CSE). **ISRAEL** (Pulawski, 1971, or as indicated): Beersheba, 5 km W Elat (1 ♀, CSE), 135 km N Elat Iddan (1 ♀, CSE), Har Badad in Arava Valley (1 ♀, CSE), Iddan in Arava Valley (14 ♀, CSE), Mazad Aqrabbim 45 km SE Beersheba (1 ♂, CSE), Mikve Israel, Moshaav Hazeva in Arava Valley (1 ♀, 1 ♂, CSE), Nakhal Zin at El Akrabim (1 ♂, CSE), Shizaf Nature Reserve in Arava Valley. **MOROCCO**: Massa near Agadir (1 ♀), 40 km W Ouarzazate and 5 km S Amerzgane (1 ♂, CSE). **SAUDI ARABIA**: Ad Diryah [also spelled Ad Diriyah, 24°44′N 46°35′E] (1 ♀, KMG), El Riyadh: Al Hair (1 ♀, KMG). **SPAIN**: **Almería**: 3 km W Benahadux at 36°55.1′N 2°28.6′W (1 ♀; 1 ♀, CSE). **TUNISIA**: 6 km W Beni Kheddache at 35°15′N 10°08′E (1 ♂, CSE), Bou Chebka at 35°11′N 8°26′E (1 ♀, CSE), Djerba Island (2 ♀, 1 ♂, paratypes of *Tachysphex agnus*), Gafsa (2 ♂), 10 km SE Foum Tataouine at 32°51′N 10°30′E (2♀, CSE), 30 km N Foum Tataouine (1 ♀, 1 ♂; 1 ♂, CSE); 30 km NW Kairouan (1 ♂), Matmata (1 ♀), 15 km W Nefta at 33°50′N 7°43′E (1 ♀, CSE), Tabarka (1 ♀, CSE), 10 km NNW Thélepte at 35°04′N 8°33′E (1 ♂, CSE), Tozeur at 33°55′N 8°08′E (2 ♀). **TURKEY**: **Ankara**: above Hasanoglan (1 ♀, paratype of *Tachysphex agnus*).

YEMEN: **Socotra**: Hadibo Plain (1 ♀; 1 ♀, BMNH), Hadibo road to Nogad at 12°26′N 54°09′E (1 ♀, CSE), Hamadara (1 ♀, BMNH), Kishin (1 ♂; 1 ♂, BMNH), Socotra: coastal road at 12°38′N 54°09′E (1 ♀), Wadi Zeewef in Homhil Plain at 12°35′N 54°18′E (1 ♀, CSE).

Tachysphex albocinctus (Lucas)
Figures 14–17.

Tachytes albocinctus Lucas, 1849:250, ♀ (as *albo cincta*, incorrect original division and termination, spelled *albocincta* on line 20 and plate 14). Holotype or syntypes: ♀, Algeria: La Calle, now El Kala (MNHN), examined by de Beaumont, 1940:172.— F. Smith, 1856:300 (listed); Magretti, 1884:588 (Eritrea); Kohl, 1885:399 (listed); Dalla Torre, 1897:687 (in catalog of world Hymenoptera); Bingham, 1898:104 (Yemen).— As *Tachysphex albocinctus*: Kohl, 1885:393 (tentative new combination, original description copied); de Beaumont, 1940:172 (new combination, in revision of Egyptian *Tachysphex*), 1947a:182 (in revision of Egyptian *Tachysphex*), 1950a:405 (Algeria), 1955:181 (Morocco), 1956a:197 (Libya); Suárez, 1959:57 (Spain); de Beaumont, 1960b:238 (Libya), 1962b:25 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Diniz, 1964:5 (Portugal); de Beaumont, 1965:65 (Greece: Crete), 1966:212 (Egypt); Pulawski, 1971:427 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:13 (Israel); Erlandsson, 1974:70 (Spain); Bohart and Menke, 1976:272 (listed); Kazenas, 1978:114, 127 (in key to Sphecidae of Kazakhstan and Central Asia); Gess, 1981:19 (South Africa, nest and prey); Gayubo, 1984b:362 (Portugal); Gayubo and Tormos, 1984:15 (Spain), 1986:12 (Spain); Asís, Gayubo, and Tormos, 1987:15 (larva); Tormos and Jiménez, 1987b:316 (Spain); Asís and Jiménez, 1988:271 (Spain); Gayubo and Mingo, 1988:77 (Spain); Asís, Gayubo, and Tormos, 1989:234 (male behavior, nest, prey); Gayubo, Asís, and Tormos, 1990:17 (Spain); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Krombein and Pulawski, 1994:13 (summary of life history), 100 (in revision of Sri Lankan *Tachysphex*); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia), 156 (review of known biology); Schmidt and Bitsch *in* Bitsch et al., 2001:238 (in Sphecid Fauna of Western Europe); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachytes ruficrus Dufour, 1854:378, sex not indicated. Holotype or syntypes: Algeria: Pontéba, now Oumm ed Drou (MNHN), not examined. Synonymized with *Tachysphex albocinctus* by de Beaumont, 1940:172, who studied type material.— As *Tachysphex ruficrus*: Kohl, 1885a:397 (tentative new combination, original description copied); Kohl *in* Dalla Torre, 1897:685 (new combination, in catalog of world Hymenoptera).

Tachysphex syriacus Kohl, 1888:146, ♂. Holotype or syntypes: ♂, Syria: no specific locality (NHMW), examined. Synonymized with *Tachysphex albocinctus* by de Beaumont, 1940:172.— Dalla Torre, 1897:685 (in catalog of world Hymenoptera); Morice, 1911:100 (Algeria, description of ♀); Arnold, 1923:152 (in revision of southern African *Tachysphex*); Bristowe, 1925:280 (Somalia, nest and prey); Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Nadig, 1933:79 (Morocco; comparison with *heliopolites*); Arnold, 1935:498 (Botswana); Guiglia, 1943b:76 and 1950:252 (Ethiopia); Dollfuss, 1989:13 (type material in NHMW).

Tachysphex peculator Nurse, 1909:515, ♂. Lectotype: ♂, India: Gujarat: Deesa (BMNH), designated by Pulawski *in* Krombein and Pulawski, 1994:100, examined. Synonymized with *Tachysphex syriacus* by R. Turner, 1917c:198, synonymy confirmed by Pulawski *in* Krombein and Pulawski, 1994:100.— As *Tachysphex albocinctus peculator*: Pulawski, 1971:431 (new status); Bohart and Menke, 1976:272 (listed).

Tachysphex mantiraptor Ferton, 1912:360, ♀, ♂. Lectotype: ♀, Algeria: La Calle, now El Kala (MNHN), **here designated**, examined. Synonymized with *Tachysphex albocinctus* by de Beaumont, 1940:172.— Ferton, 1912:360 (nesting habits and prey), 402 (review of structural and behavioral characters), 1923:124 (nest, prey).

Tachysphex argyrius Gussakovskij, 1933:280, ♀, ♂ (♂ = *Tachysphex grandissimus*). Lectotype: ♀, Iran: mountains south of Bampur (ZIN), designated by Pulawski, 1971:432, examined before 1971. Synonymized with *Tachysphex albocinctus peculator* by Pulawski, 1971:431.— Gussakovskij, 1952:237 (description of ♂).— As *Tachysphex albocinctus argyrius*: Myartseva, 1972a:78 (Turkmenistan).

Tachysphex dusmeti Giner Marí, 1934:142, ♀, ♂. Syntypes: Spain: Valencia: Dehesa and Bétera (MNCN), not

examined. Synonymized with *Tachysphex albocinctus* by de Beaumont, 1950b:18, who studied type material.— Giner Marí, 1943a:139 (in Sphecid Fauna of Spain), 1945:360 (Morocco, as *Tachytes*); de Beaumont, 1947a:184 and 1950a:405 (Algeria), corrected to *Tachysphex nubilipennis* by de Beaumont, 1950b:18; de Andrade, 1949:15 (Portugal).

Tachysphex nubilipennis de Beaumont, 1950b:18, ♀, ♂. Lectotype: ♂, Egypt: Siwa oasis: El Arig (BMNH), **here designated**, examined. **New synonym**.— de Beaumont, 1955a:181 (Morocco); Pulawski, 1971:434 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:275 (listed).

As *Tachysphex heliopolites*: Morice, 1897:306 (♂ only), corrected to *Tachysphex albocinctus* by de Beaumont, 1940:172.

As *Tachytes etruscus*: Bischoff, 1933:5 (Morocco), corrected to *Tachysphex albocinctus* by Pulawski, 1962:407.

Recognition.— *Tachysphex albocinctus* has erect, conspicuous setae on the basal declivity of tergum I (Fig. 16), and in the hindwing crossvein cu-a in is markedly inclined (the anal end further away from the wing base than the cubital end). This combination is also found in *bruneiceps* and many *detritus*. Unlike *bruneiceps*, the postocellar area of *albocinctus* is narrow (width 0.6–1.0 × length in female and 0.7–1.3 × in male, rather than 1.7–2.0 ×), and scutal punctures (Figs. 15a, b) average about 1 diameter apart on the disk rather than 2–3 to many (Figs. 71a, b). Unlike *detritus*, *albocinctus* lacks a longitudinal carina on sternum I, its forebasitarsus is expanded apically (Figs. 14c, d) except not expanded in occasional males, the female pygidial plate is broad, uniformly granulose except for superficial, sparse punctures (Figs. 15e, f), and male sterna are largely glabrous (at least sternum III of *detritus* has dense, erect setae).

Relationship to *Tachysphex laticauda*.— *Tachysphex laticauda* Gussakovskij, 1933, a species that ranges from Israel and Syria to Iran, Tajikistan, and Kazakhstan, is almost identical morphologically to *albocinctus*. It differs in having a red gaster (apical segments darkened in some specimens) and partly or all red legs (femora and tibiae black in occasional males). It could well be another color form of *albocinctus*, but the male clypeus is slightly longer (see Pulawski, 1971, Figs. 400 and 406). A female from Silifke area, Turkey, with largely red legs and partly red sternum II, appears to be intermediate in color. Although the geographic range of *laticauda* overlaps that of *albocinctus*, I am not aware of mixed populations. Additional material is needed to evaluate the status of *laticauda*.

Justification of new synonymy.— De Beaumont (1950b) named *nubilipennis* those North African males in which the wings are markedly infumate, thoracic setae dark, the terga have no silvery fasciae, and the shortest interocular distance is equal to 0.75 of flagellomere I; in addition, sternal punctures in some but not all specimens are somewhat larger and sparser than average for *albocinctus*. Such individuals are found in Morocco (Ksar es Souk), Algeria (Tadjemount), Tunisia (15 km W Nefta), Libya (Tripoli, Bardin, Gat, and Jalu), and Lower Egypt (Wadi Rayyan in Fayum Province, El Arig and Siwa in Siwa oasis). However, males of *albocinctus* from Marsa Matruh area, Egypt, differ from *nubilipennis* only in having less infumate wings (but more so than in most Egyptian and other specimens), finer and denser punctures of sternum II, and the shortest interocular distance is 0.9 of flagellomere I or more; also, some have silvery tergal fasciae. I regard this population as intermediate between *nubilipennis* and the average *albocinctus* and, as full intergradation is practically certain, I consider *nubilipennis* to be merely a variant of *albocinctus*. The penis valve in the lectotype and two other specimens is exactly as in *albocinctus*, not as illustrated by Pulawski (1971, here redrawn as Fig. 14g) who used a slightly aberrant specimen from Ksar es Souk, Morocco, as a model. See Variation below for more details.

Description.— Punctures of postocellar area varying from about one to several diameters apart. Scutal punctures averaging about one diameter apart in some specimens and tightly com-

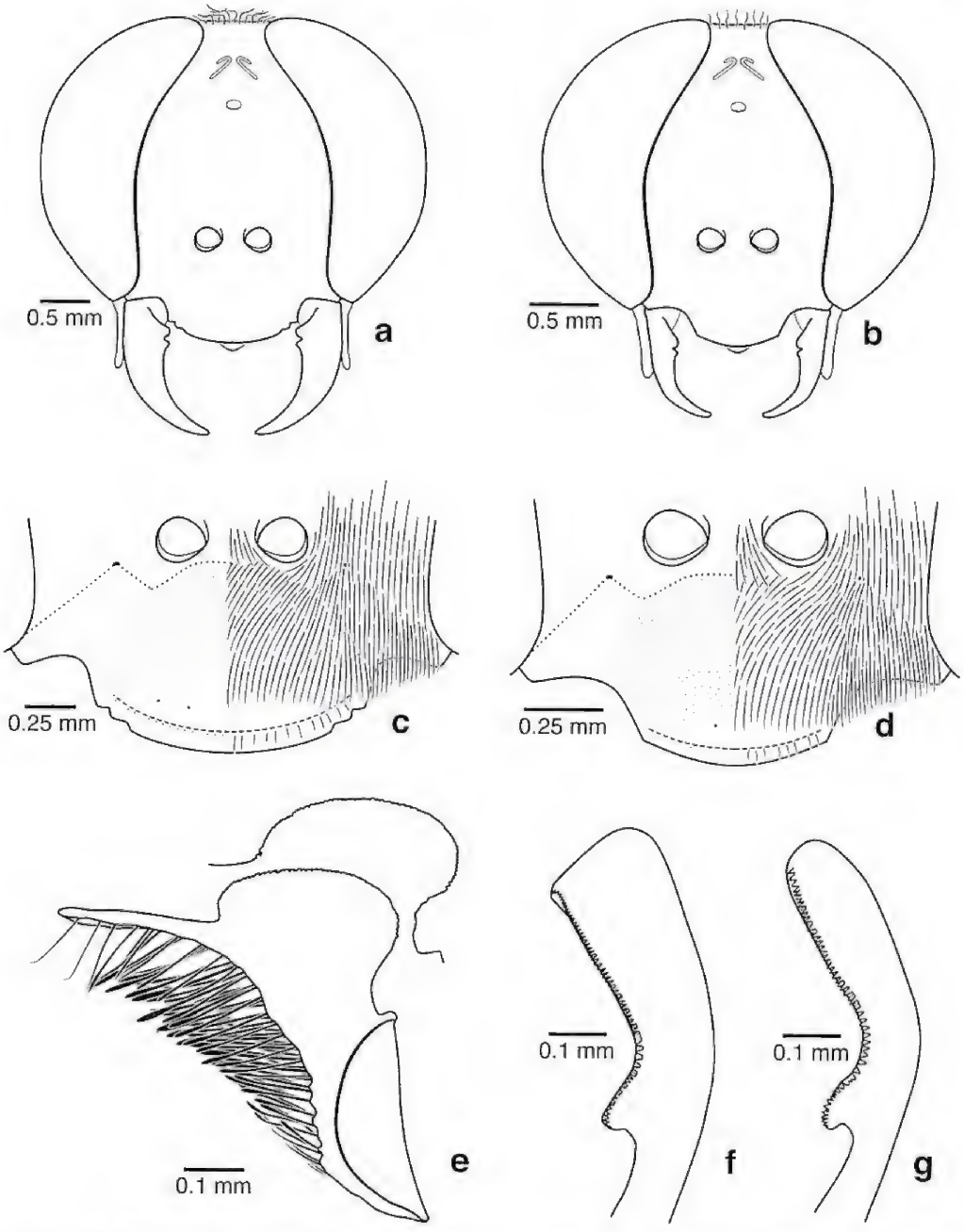

FIGURE 14. *Tachysphex albocinctus* (Lucas): a – female head, frontal view; b – male head, frontal view; c – female clypeus; d – male clypeus; e – volsella; f – penis valve; g – penis valve of an aberrant Moroccan specimens illustrated as *nubilipennis* by Pulawski (1971).

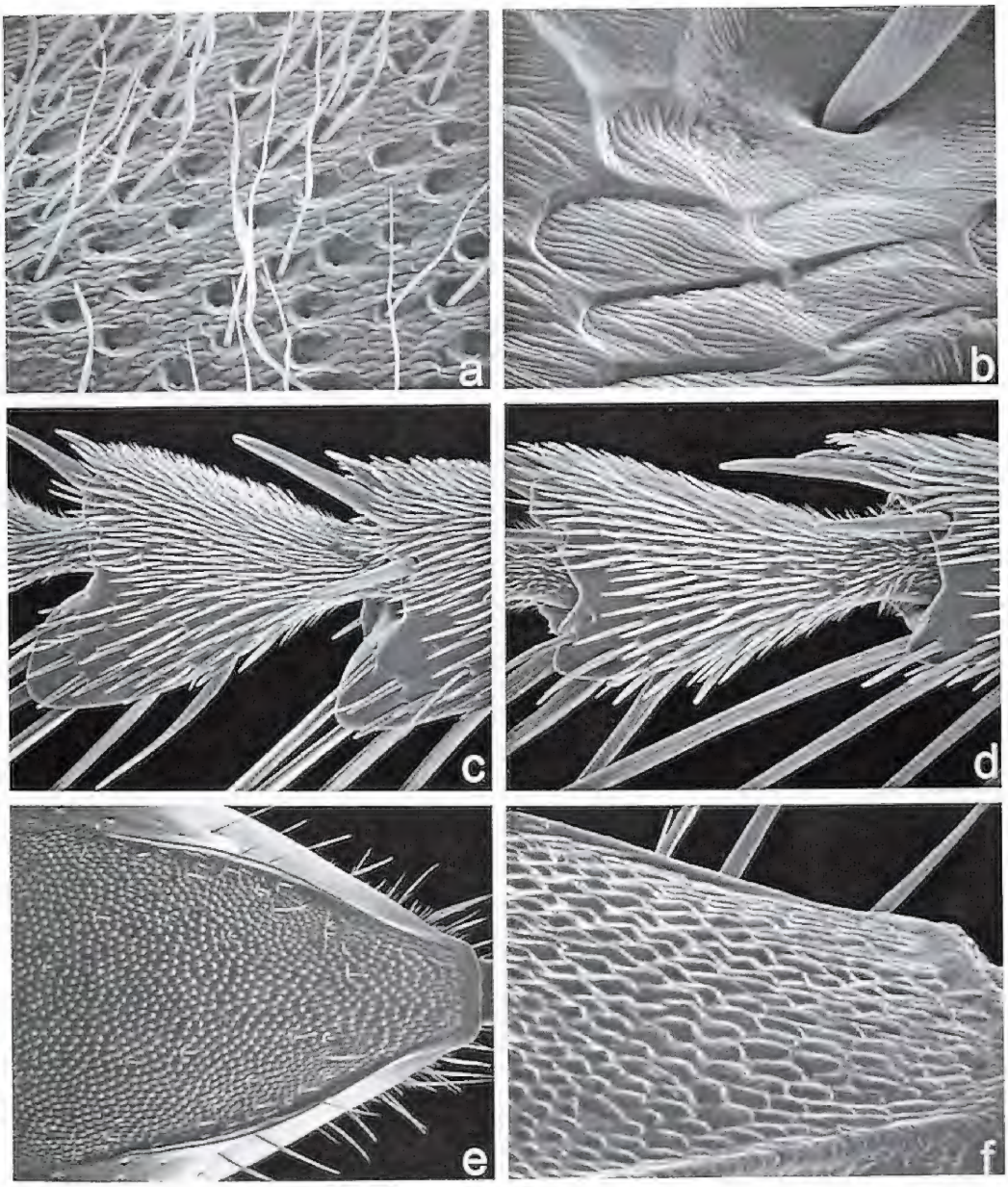

FIGURE 15. *Tachysphex albocinctus* (Lucas): a – scutal disk surface, lateral oblique view (×300), part of setae removed to show punctures and distances between them; b – same, higher magnification (×3000); c – apex of female foretarsomere I and foretarsomere II (×108); d – apex of male foretarsomere I and foretarsomere II (×135); e – female pygidial plate (×48); f – portion of female pygidial plate in lateral view showing granulate sculpture (×240).

pressed against each other in others (Figs. 15a, b). Mesopleuron finely, somewhat irregularly rugose. Propodeal dorsum microscopically, irregularly rugose, side dull, evenly microsculptured, in many specimens also finely, irregularly rugose (except anteriorly); posterior surface, in dorsal third or so, with wide median impression. Hindwing crossvein cu-a oblique (anal end further away from wing base than cubital end). Forebasitarsus expanded apically (Figs. 15c, d) except not expanded in occasional males. Hindcoxal dorsum with inner margin not carinate or carinate basally. Apical tarsomeres with several ventral bristles (including one preapical), but no spines on venter or lateral margin. Sternum I shallowly depressed apically.

Setae: sinuous on frons, scapal venter, postocellar area, gena, scutum (at least anteriorly), mesopleuron, and propodeum (including posterior surface); suberect to erect on frons, postocellar area, gena, scapal venter, and basal declivity of tergum I (Fig. 16); appressed on hindfemoral venter in vast majority of specimens but erect, rudimentary in some; varying on propodeal dorsum: inclined slightly anterad, erect, or inclined posterad. Setal length expressed as a fraction of basal mandibular width: on postocellar area about 0.5 in female and 0.8 in male, 0.8–1.0 on each side of oral fossa next to occipital carina, and up to 0.8 on tergum I. Mesopleural setae largely concealing integument in female.

FIGURE 16. *Tachysphex albocinctus* (Lucas): gastral segment I in profile showing erect setae.

Head, thorax, and gaster black. Frontal setae silvery in most females, golden in some, black in large males, silvery in small ones (some setae silvery and others black in intermediate specimens). Color of thorax, legs, wings and tergal fasciae: see Variation below.

♀.— Clypeus (Fig. 14c): bevel convex, about 0.25–0.5 × length of basomedian area; lip free margin arcuate, with two lateral incisions (Figs. 14a, c) on each side except not incised in specimens from Siwa oasis, Egypt, and those from Iran and Transcaspia. Length of flagellomere I 2.2–3.1 × apical width. Width of postocellar area 0.6–1.0 × length (Fig. 14a). Dorsal foretibial surface with two or three spines, outer surface with three spines. Forebasitarsus with 8–13 rake spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate broad, uniformly granulose except for superficial, sparse punctures (Figs. 15e, f). Length 11.0–15.0 mm.

♂.— Inner mandibular margin with tooth and cleft. Clypeus (Fig. 14d): bevel convex, about 0.25–0.5 × length of basomedian area; lip free margin arcuate, with obtusely angulate, nonprominent corner; distance between corners 1.5–1.6 × distance between corner and orbit. Width of postocellar area 0.7–1.3 × length (Fig. 14b). Dorsal length of flagellomere I 2.0–2.5 × apical width. Forefemoral notch shallow, with microscopic, erect setae. Outer margin of forebasitarsus with 7–9 rake spines; outer apical spine of foretarsomeres I and II longer than following article. Punctures of tergum VII averaging several diameters apart (except apically and laterally). Sternum II densely micropunctate and pubescent throughout or apical depression largely glabrous, sterna IV–VI largely glabrous. Length 8.0–12.0 mm. Volsella and penis valve: Figs. 14e–g.

VARIATION.— Scutal setae: subappressed posteriorly in most specimens, but erect in males from Ivory Coast, Ghana, Namibia, and in some from Tanzania and some from Egypt (Marsa

Matruh area and Siwa oasis); also erect in females from Marsa Matruh area, Egypt.

Color of legs: in most specimens, the legs are black except the tarsal apex or all tarsi are reddish, also tibiae in some specimens. All legs except coxae and forefemur are red in a female from Kayar, Senegal, and another from Silifke area, Turkey, and all legs except coxae are red in females from Dakar, Senegal (1 ♀), Sokodé area, Togo (2 ♀), Tamale area, Ghana (1 ♀), Torodi area, Niger (2 ♀), and Kano area (1 ♀) and Maiduguri (1 ♀), Nigeria. All legs including coxae are red in females from Banjul, Gambia (1 ♀), Ouagadougou, Burkina Faso (1 ♀), Karal-Douguia, Chad (1 ♀), Kano area (1 ♀), Ibadan, Nigeria (1 ♀), and Lodwar, Kenya (4 ♀).

Color of female gaster: all black in most specimens, but pygidial plate reddish in females from Banjul, Gambia (1 ♀), Ouagadougou, Burkina Faso (1 ♀), Karal-Douguia, Chad (1 ♀), Maiduguri, Nigeria (1 ♀); and red in females from Dakar, Senegal (1 ♀), Sokodé area, Togo (2 ♀), Doka, Sudan (1 ♀), and Lodwar, Kenya (4 ♀). Most of segment I and base of tergum II are red in female from Nefta area, Tunisia, and sternum II is partly red in female from Silifke area, Turkey.

Color of female frontal setae: setae silvery in most specimens, but golden in those from Banjul, Gambia (1 ♀), Ouagadougou, Burkina Faso (1 ♀), Torodi area, Niger (2 ♀), campement des Eléphants area, Cameroon (3 ♀), Karal-Douguia, Chad (1 ♀), Maiduguri, Nigeria (1 ♀), Sokodé area, Togo (2 ♀), Lodwar, Kenya (4 ♀), Mabokweni area, Tanzania (1 ♀), Mkomazi area, Tanzania (1 ♀), and Silifke area, Turkey (1 ♀).

Color of female thoracic setae: setae silvery in most specimens, but conspicuously golden in those from Banjul, Gambia, Ouagadougou, Burkina Faso, Torodi area, Niger, campement des Eléphants area, Cameroon, Karal-Douguia, Chad, Maiduguri, Nigeria, Isiolo area, Kenya (1 ♀), Lodwar, Kenya, and Silifke area, Turkey; and brown in one ♀ from Springbok area, South Africa.

Color of wings: wing membrane mostly hyaline (yellowish basally), but somewhat darkened basally in males from Marsa Matruh area, Egypt, and conspicuously infumate except apically in some (same localities as for males with nonfasciate gaster, see below).

Color of female tergal fasciae: fasciae mostly silvery, but brownish in specimens from the Ivory Coast; Togo; Torodi area, Niger; Kano area, Nigeria; Shaba Province, Zaire; and conspicuously golden in those from Banjul, Gambia; Ouagadougou, Burkina Faso; and Lodwar, Kenya.

Number of tergal fasciae: terga I–III or I–IV silvery fasciate apically in most specimens, but only terga I–II in a male from Albufeira, Portugal, and only tergum I in a male from Saqqara, Egypt. Most males from Marsa Matruh area, Egypt, have no tergal fasciae, but some have one or two. Males from the following localities have no tergal fasciae: Morocco: Ksar es Souk; Algeria: Tadjemount; Tunisia: Nefta area; Libya: Tripoli, Bardin, Gat, Jalu; and Egypt: El Arig in Siwa oasis.

NESTING HABITS AND MALE BEHAVIOR.— Ferton (1912, 1923) observed habits of *albocinctus* in Algeria, Bristowe (1925) in Somalia, Gess (1981) in South Africa, and Asís, Gayubo, and Tormos (1989) in Spain. Their data are summarized below. Asís, Gayubo, and Tormos (1987) described the mature larva.

Tachysphex albocinctus nests in friable, mainly sandy soils, in flat or gently sloping sites. The nest has an oblique burrow that is 10–15 cm long (straight or angulate near the midlength) and 1–3 horizontal cells placed 3.5–8 cm below the surface. During nest excavation, sand accumulates in a spoil heap behind the entrance, but the female flattens it using her tarsal rake and walking toward the nest while the sand is projected behind her. Having completed the nest, she performs orientation flights and goes hunting. The nest is temporarily closed during the provisioning period except when the wasp is inside. When provisioning is completed, she fills the burrow with sand and, unlike other Sphecidae, builds a characteristic mound over it. Prey consists of mantids, 13–41 mm long, both males and females and usually nymphs, such as *Mantis religiosa* Linnaeus (Spain), *Calidomantis* Rehn (Somalia), and *Tarachodes* Burmeister (Somalia). The female malaxates the

mantid after stinging it and drinks the fluids that pour from the prey's mouth. The prey is flown to the nest under the wasp's body, headfirst and dorsum up. It is held by its antennae with the wasp's mandibles, her midlegs supporting the prey behind its head and the hindlegs at the level of prey's forelegs. The female lands at the nest entrance and opens it without dropping the prey, but releases it when most of the prey's body has been brought inside. The female then turns around, seizes the prey with her mandibles, and drags it in. One to seven mantids are deposited per cell, all head in. Since the prey length is greater than the cell's length, their legs and occasionally abdomens extend into the burrow (the prey's body is curved in such cases). Individual prey may lay venter up, venter down, or on the side. The egg is deposited by one of its ends on one of the last prey, perhaps the last one, and placed transversely on the mantid's throat next to its forecoxae. Asís, Gayubo, and Tormos (1989), whose records are the most detailed, noted cases of theft among neighboring females when one of them released the prey to introduce it into the nest. Prey theft occurred only when the females were in the provisioning phase (digging females paid no attention to prey).

Males spend most of their time perching on the ground or small objects (such as pebbles or dead branches), located in the nesting areas of females, with their antennae stretched forward. From time to time they make short flights and return to the same or a nearby perch. Other insects and especially conspecific males are chased away. During the hottest parts of the day, some males excavate short burrows (1.5–2.3 cm long), which they enter and close behind them.

Geographic distribution (Fig. 17).— Africa, southern Iberian Peninsula, Crete, southwestern Asia (Israel, Jordan, Syria, Yemen) to Transcaspia (Tajikistan, Turkmenistan, and Uzbekistan), and northwestern India.

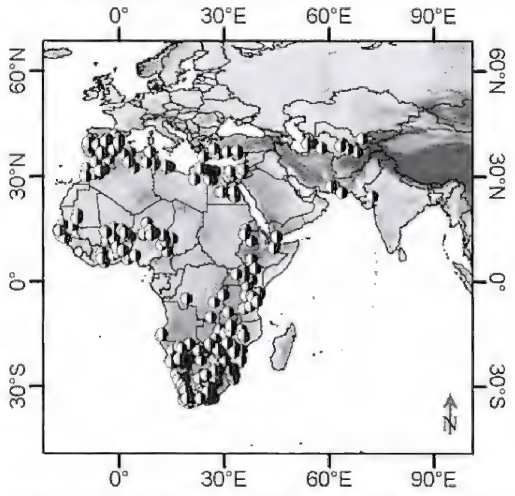

Figure 17. Collecting localities of *Tachysphex albocinctus*.

Records (localities not followed by numbers of specimen studied or bibliographic reference are all from Pulawski, 1971, including those for *nubilipennis*).— **ALGERIA**: El Kala (8 ♀, 4 ♂, MNHN, including lectotype ♀ and 3 paralectotype ♀ of *mantiraptor*), Laghouat (1 ♀), Maison Carrée near Alger (1 ♀), Oumm ed Drou (Dufour, 1854, as Pontéba), Selfana (or Zelfana), Tadjemount. **ANGOLA**: Curoca River 7 mi NE Porto Alexandre (1 ♀, 2 ♂, BMNH), Giraul River 10 mi NE Namibe (3 ♂, BMNH). **BENIN**: Cotonou (1 ♀, ZMAN), 15 km SE Savé (2 ♀, OÖLM). **BOTSWANA**: 25 mi W Gweta at 20°17′S 24°54′E (2 ♀, BMNH), 18 mi NE Kalkfontein (1 ♀, 1 ♂, BMNH), 42 mi W Kalkfontein (3 ♀, 1 ♂, BMNH), Kaotwe (1 ♀, TMP), Mabela a Pudi (1 ♀, TMP), Moremi Reserve (2 ♀, BMNH), Ngamiland (1 ♂, BMNH), Palapye (1 ♀, 2 ♂, BMNH). **BURKINA FASO**: 38 km SSW Dédougou at 12°10.5′N 3°36.5′W (1 ♂), 15 km SE Gorom Gorom (1 ♀), Ouagadougou (1 ♀, 1 ♂, ZMAN). **BURUNDI**: Bururi (1 ♀, MRAC). **CAMEROON**: **Nord**: 15 km W Campement des Eléphants and 67 km S Garoua (3 ♀, 1 ♂). **CHAD**: Karal-Douguia (1 ♀, ZMAN). **EGYPT**: **Al Fayyum**: Fayyum (1 ♂, CU), Karanis (3 ♂), Kom Osheim (12 ♂), Lake Qarun, 10 km E Qarun (1 ♂, CSE), Wadi Rayyan at 29°02′57″N 30°18′11″E (1 ♂, AMNH). **Al Iskanderiyah** (= Alexandria): Amrye. **Al Jizah** (= Ghiza): Abu Rawash, Dahshur (9 ♂), Ghiza (1 ♀, 5 ♂), Saqqara (1 ♂). **Al Qahirah** (= Cairo): Gebel Asfar, Maadi (1 ♂). **Al-Uksur** (= Luxor): 3 km W Luxor (5 ♂). **Al-Wadi al-Jadid**: Dakhla oasis: El Gedida (1 ♀), Tineida (1 ♀, 1 ♂); Kharga oasis: El Kharga (2 ♂). **As Suways** (= Suez): Fayed (1 ♂). **Aswan**: Aswan (2 ♂), near Kom Ombo temple (1 ♀, 1 ♂). **Dumyat**: Fariskur. **Matruh**: 20 km E Marsa Matruh (4 ♂), 20–25 km W Marsa Matruh (10 ♀, 23 ♂), 25–35 km W Marsa Matruh (2 ♀), 64 km W Marsa Matruh (3 ♀), Siwa oasis: El Arig (1 ♂, BMNH,

lectotype of *nubilipennis*; 1 ♂, LAUSANNE, paralectotype of *nubilipennis*) and Siwa (1 ♀, paralectotype of *nubilipennis*, BMNH). **ERITREA**: Khor Gergabb (2 ♂, GENOVA, det. *Tachytes albocinctus* by P. Magretti). **ETHIOPIA**: **Gamo Gofa**: Caschei (Guiglia, 1950), 49 road km SE Sodo (1 ♂). **Harerge**: Moullou in s. Harerge (2 ♂, MNHN), Awash River (Arnold, 1951; spelled Hawash). **Sidamo**: 26 km N Moyale (1 ♀, 10 ♂; 2 ♂, AAU), 35 km N Moyale (1 ♀). **GAMBIA**: Abuko (1 ♂, KMG), Bamba Forest about 4 km NNW Brikama Road junction (1 ♂, ZMLU), Banjul (1 ♀, ZMAN), 6 km N Kartung (3 ♂, ZMLU). **GHANA**: Kawampe 45 km N Kintampo at 8°30′N 1°35′W (3 ♂), 30 km S Kintampo (1 ♂), 35 km N Tamale (1 ♂), Kito (2 ♀, BMNH). **GREECE**: **Aegean Islands**: Rhodes: Faliraki at 36°20′N 28°13′E (1 ♂, MSNT), Samos (1 ♀, 1 ♂, SCHL). **Kriti** (= Crete): Canea. **INDIA**: **Gujarat**: Deesa (2 ♂, BMNH, lectotype and paralectotype of *peculator*). **IRAN**: **Baluchestan va Sistan**: Gurmuk S Bampur. **ISRAEL**: 8 km NNE Ashkelon 1 ♀, 3 ♂, (CSE), Bat Yam 3 km S Yaffa (1 ♀), Bir Rehme 30 km SSE Beersheba (2 ♀), Ein Quit 15 km S Jerusalem, Sede Boker 40 km S Beersheba, Tel Aviv, Wadi Avrat 48 km S Beersheba, Wadi el Kelt (1 ♂, OÖLM). **IVORY COAST**: 40 km NW Abijan (1 ♀, MSNT), 50 km N Bouaké (1 ♂), Katiola (1 ♀, MSNT), 40 km S Toumodi (1 ♀, 3 ♂). **KENYA**: **Coast Province**: Karacha Forest 16 km N Kilifi (3 ♀), Kitani Lodge in Tsavo West National Park (1 ♀), Malindi (1 ♀, BMNH; 1 ♂, ZMAN), 20 km S Mombasa (1 ♀, CNC; 1 ♂, USNM), Mount Kasigau (3 ♂), Shimba Hills (1 ♀, CNC), Shimba Hills at 4°12.3′S 39°25.0′E (1 ♂), Taita Discovery Centre (1 ♂), Taita Discovery Centre: Galla Hill area (1 ♂), Ukunda (1 ♂, USNM), Voi (3 ♂), about 1 km SE Voi (1 ♀), Voi area (2 ♀, 5 ♂, OÖLM), 1 mi W Watamu in Kilifi District (1 ♀). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (2 ♀, 6 ♂), 5 km NNE Isiolo (1 ♀, 2 ♂). **Rift Valley Province**: Lodwar (3 ♀, 3 ♂; 2 ♂, NMK), 120 km S Lodwar (1 ♂), Magadi road 46 air km SW Nairobi (2 ♂), Magadi road 51 air km SW Nairobi (1 ♂), Marich Pass Field Studies Centre (1 ♀, 5 ♂). **LIBYA**: **Cyrenaica**: Bardin (as *nubilipennis*), El Adem, Jalu (1 ♂, paralectotype of *nubilipennis*, LAUSANNE), Tmimi. **Tripolitania**: Gargaresc, Garian, Gat (1 ♀, MILANO, labeled paratype of *nubilipennis* by de Beaumont), Leptis Magna, Tagiura, Tripoli (as *nubilipennis*). **MALAWI**: Cape Maclear (1 ♀, ZMAN), Mlanje (1 ♀, BMNH), Zomba (1 ♀, BMNH). **MALI**: 25 km E Hombori (1 ♂), 10 km E Mopti (1 ♂, MS), 70 km SW Mopti (1 ♂). **MAURITANIA**: Kaedi (1 ♀, FB), Rachid 40 km NW Tijikja (1 ♀), Tamouret Naaj ca 30 air km NE Moudjéria (1 ♂). **MOROCCO**: Agadir, 60 km S Agadir (1 ♂, CSE), Boumalne, Draa Valley 10 km S Agdz (1 ♂, CSE) and 30 km NW Zagora (1 ♂, CSE), Imiter (1 ♂), Marrakech: Ksar es Souk (1 ♂), Mehdia near Kenitra, Muley Rechid (Giner Marí, 1945), 15 km NW Ouarzazate (1 ♂), 10 km SE Ouarzazate (3 ♂, CSE), Oued Tensift (1 ♀, 3 ♂), Rabat (Bischoff, 1933, as *Tachytes etruscus*, corrected by Pulawski, 1963), 40 km from Tazenakht Anezal in Anti-Atlas (1 ♂, CSE), Tinerhir, Tiznit: Oued Massa. **MOZAMBIQUE**: Maputo (2 ♀, 1 ♂, CU; 1 ♀, ZMAN; 1 ♀, UST), 70 km N Maputo (1 ♀, OÖLM), 25 km N Massinga in Inhambane Province (1 ♂, OÖLM), Pungwe Bay (1 ♂, TMP). **NAMIBIA**: **Gobabis District**: W Gobabis (1 ♂, BMNH). **Grootfontein District**: 10 km NE Grootfontein (1 ♂, OHL), 90 km NE Grootfontein (1 ♂, JG). **Karasburg District**: Fish River canyon 15 km E Ai-Ais (1 ♂, SDNHM), Great Karas Mts. (1 ♀, SAM), Karasburg (1 ♂, AMG). **Karibib District**: Ameib Farm 19 mi NW Karibib (1 ♂, BMNH), 15 km W Karibib (1 ♂, MS), 88 km E Walvis Bay (1 ♂). **Keetmanshoop District**: Keetmanshoop (1 ♂, AMG). **Lüderitz District**: Aus (2 ♂; 2 ♀, BMNH). **Mariental District**: Mariental (1 ♀, 1 ♂, AMG), 5 km S Mariental (1 ♀, AMG), 71 km E Stampriet (1 ♂, AMG), 20 km S Stampriet (1 ♂, FSCA). **Okahandja District**: Leeu River 9 km W Okahandja (1 ♀), Okahandja (2 ♂, AMG; 1 ♀, BMNH), 17 km W Okahandja (2 ♂, MS), 20 km W Okahandja (1 ♂, FSCA). **Outjo District**: 31 km SE Kamanjab (3 ♂; 1 ♀, 10 ♂, MS). **Rehoboth District**: 15 km N Kalkrand (1 ♀; 1 ♀, 5 ♂, MS), 9 km S Rehoboth (1 ♂, MS), 23 km N Rehoboth (1 ♂). **Rundu District**: Rundu (1 ♀, OHL), 26 km (1 ♂, JG) and 30 km E Rundu (3 ♂, MS), 100 km SW Rundu (1 ♀, 1 ♂, MS). **Swakopmund District**: Ganab (1 ♂, PPRI), Goanikontes (1 ♂, BMNH), Gobabeb at Kuiseb River (1 ♀, PPRI), between Kuiseb and Gaub passes (1 ♀, AMG), Namib Desert Research Station (1 ♂, USU), Swakop River E Swakopmund: 5 km (1 ♂, ZMUC), 10 km (1 ♀, 3 ♂; 2 ♀, MS; 2 ♂, NMN), and 15 km (4 ♂, JG), Swakopmund (4 ♂, AMG; 2 ♀, 4 ♂, BMNH; 2 ♂, JG), Swakop River mouth (2 ♂, CAS, NMN; 2 ♀, 1 ♂, ZMUC). **Tsumeb District**: Namutoni (1 ♀, TMP), 10 km SE Tsumeb (2 ♀; 1 ♂, MS). **Walvis Bay District**: Rooibank (1 ♀, AMG). **Windhoek District**: Aris 25 km S Windhoek (3 ♀, 2 ♂; 1 ♀, 2 ♂, MS), Bismarck River 30 km E Windhoek (2 ♀, 2 ♂; 1 ♂, MS), 20 km ESE Seeis (1 ♀, AMNH), Windhoek (1 ♂, AMG), 25 km N Windhoek (1 ♀, 1 ♂, JG; 1 ♀, OÖLM), 30 km N Windhoek (1 ♀, MS). **NIGER**: **Agadez Region**: 10 km S Agadez at 16°50.7′N 7°58.4′E (1 ♀), 30 km S Agadez at 16°39.0′N 7°56.9′E (1 ♀). **Diffa Region**: 3 km N Diffa at 13°21.3′N 12°36.4′E (1 ♂), 20 km SW

Diffa at 13°13.1′N 12°25.9′E (1 ♀, 9 ♂). **Dosso Region**: 15 km S Dosso at 12°53.5′N 3°10.1′E (1 ♀). **Maradi Region**: 8 km W Guidan-Roumji at 13°38.2′N 6°38.2′E (3 ♂), Maradi (1 ♂, MNHN), 17 km NNW Maradi at 13°38.7′N 7°02.6′E (1 ♂), 23 km NNW Maradi at 13°42.3′N 7°01.4′E (1 ♂). **Niamey** Region: Niamey (1 ♀, 1 ♂, KMG). **Tillabéri Region**: 3 km N Ayorou at 14°45.7′N 0°54.0′E (2 ♂), 5 km NW Kollo at 13°21.6′N 2°16.4′E (1 ♀), 2 km SE Kollo at 13°19.6′N 2°19.9′E (1 ♀), 13 km N Niamey at 13°32.6′N 2°16.4′E (2 ♂), 25 km N Niamey at 13°33.2′N 2°23.6′E (2 ♂), 84 km ESE Téra at 13°51.2′N 1°32.7′E (1 ♀, 1 ♂), 30 km SW Torodi at 12°48.8′N 1°42.4′E (2 ♀). **Zinder** Region: 17 km W Gouré at 13°52.5′N 10°09.3′E (2 ♂), 47 km W Gouré at 13°41.8′N 6°52.1′E (1 ♀), 11 km S Tanout at 14°52.6′N 8°52.3′E (1 ♂), 45 km S Zinder at 13°27.3′N 9°00.5′E (1 ♀, 1 ♂). **NIGERIA**: Azare in southeastern Kano (2 ♀, BMNH), Ibadan (2 ♀, BMNH), Ile-Ife at 7°28′N 4°34′E (1 ♀, BMNH), Maiduguri (1 ♀, KMG). **PAKISTAN**: **Baluchistan**: Pasni Rek (1 ♂, BMNH). **PORTUGAL**: (Diniz, 1964, or as indicated): Albufeira (2 ♂), Aljustrel, Caparica (1 ♂), Évora, Lagoa de Albufeira, Porta de Lagoa (Gayubo, 1984b), Portimão (1 ♂), Quartereira (Gayubo, 1984b), Seixal, Setúbal, Sines, Trafaria near Lisboa (3 ♂), Troia, Vale de Gaio. **SENEGAL**: Dakar (2 ♀, 3 ♂, FB), Kayar (1 ♂, FB; 1 ♀, 1 ♂, MSNT), 40 km NE St. Louis (2 ♀), Toubacouta (6 ♂, MSNT), Yenne (1 ♂, FB). **SOMALIA**: Bulhar (1 ♀, BMNH), Hargeisa (Bristowe, 1925). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (1 ♀; 8 ♀, 2 ♂, TMP), NNW Bedford at 32°33′S 26°00′E (2 ♂), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (4 ♀, 1 ♂, AMG), Elandsheuwels Farm 40 km W Steytlerville (1 ♀, USU), Goodehoop Farm 16 km W Steytlerville (3 ♂, USU), Graaff-Reinet (2 ♂, AMG), Grahamstown (1 ♂, AMG), 12 and 17 mi NW Grahamstown (2 ♂, AMNH), 18 km WNW Grahamstown: Hilton Farm (1 ♂; 33 ♀, 24 ♂, AMG), Great Brak River (1 ♀, SAM), Jeffreys Bay (1 ♀, 3 ♂, SAM), Liebendal at 31°43′ 25°55′E (1 ♂, SAM), Middelburg (7 ♂, AMG), Olifantsrivier 30 km NNE Uniondale at 33°27′S 23°19′E (1 ♂), Port Alfred (3 ♂, AMG), Rietbron (1 ♀, AMG), Steytlerville (1 ♀; 1 ♀, AMG), 6 km N Steytlerville (4 ♀, 1 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (2 ♂, USU), 37 km NW Steytlerville at 33°11′S 24°10′E (2 ♂, CSE), Van Stadens River mouth at 33°58′S 25°13′E (1 ♂, SAM), Vlakwater 27 km NW Grahamstown (1 ♀, AMG), Waterford (2 ♂, AMG), Willowmore (1 ♀, 2 ♂; 3 ♀, 5 ♂, AMG; 3 ♀, 10 ♂, TMP), 9 km E Willowmore (2 ♀, 4 ♂), 43 km NE Willowmore: Plessierivier (1♂, USU), 37 km NW Willowmore in Grootrivierberg Range (1 ♂), 12 km W Willowmore at 33°16′S 23°22′E (2 ♂). **Free State**: 30 km N Colesberg at Orange River (1 ♀, OÖLM), Gum Tree (1 ♀, BMNH), Kroonstad (2 ♂, AMG; 1 ♂, AMNH), Tussen Die Riviere Game Reserve (1 ♀, 9 ♂). **Gauteng**: Bryanston at 26°04′S 28°01′E (3 ♂, AMG), Pretoria: Botanical Garden (1 ♂). **Kwazulu-Natal**: 20 km S Emanguzi (2 ♂, OÖLM), SW Emanguzi (1♂, OÖLM), Fanies Island in Santa Lucia Lake (1 ♂, AMG), Hluhluwe (1 ♂, ZMAN), Mbazwana (1 ♀, OÖLM), Mkuze Game Reserve (1 ♂, AMG), Ndumu Game Reserve (4 ♀, ZMAN), Lake Santa Lucia N (1 ♀, TMP), Lake Santa Lucia at False Bay (1 ♀, ZMAN), Tembe Elephant Park (7 ♀, 2 ♂, OÖLM). **Mpumalanga**: 40 km SW Komatiepoort (1 ♀, 1 ♂, OÖLM), Pretoriuskop in Kruger National Park (1 ♂, PPRI; 1 ♂, USNM). **Northern Cape Province**: 40 km S Garies (6 ♂, OÖLM), Goodhouse (2 ♂, SAM), 25 km E Hondeklipbaai (4 ♂, OÖLM), Hopetown (1 ♂, AMG), E Kamieskroon (4 ♂, OÖLM), Nieuvwoudtville (1 ♂, BMNH), Olifantshoek (1 ♂, AMG; 1 ♂, FSCA), near Richtersveld National Park between Annis and Dabie Rivers at 28°20′S16°55′E (1 ♀, AMG), Springbok (1 ♀, 1 ♂, AMG), N Springbok (1 ♂, SAM), SW Springbok (1 ♀, 3 ♂, OÖLM), Tanqua-Karoo National Park (2 ♀, 6 ♂, SAM), VanWyksfontein 8 km W Norvalspont (3 ♂, AMG), Victoria West (1 ♀, AMG). **Northern Province**: Afguns (1 ♀, 2 ♂, AMG), Ellisras (3 ♀, 2 ♂, AMG), Guernsey Farm 15 km E Klaserie (1 ♂, PMA), 10 km SW Naboomspruit (1 ♂, FSCA), Warmbad (1 ♀, AMG), 5 mi N Warmbad (1 ♂, USNM), Wyllies Poort (1 ♀, BMNH). **North-West Province**: 5 km S Brits (1 ♀, OÖLM), Kosmos to Rustenburg (1 ♀, ZMAN), 45 km N Pretoria (1 ♀, 8 ♂, MS), Rustenburg (1 ♂, OHL), Vryburg (1 ♀, 2 ♂, SAM). **Western Cape Province**: Agulhas (2 ♂, PPRI), Beaufort West: Oukloof (2 ♀, 3 ♂, SAM), Cape Town (1 ♂, AMG; 1 ♂, BMNH; 1 ♂, TMP; 1 ♀, 3 ♂, USNM), Cape Town: Constantia at 23°02.6′S 18°25.8′E (1♂, USU), Cape Town: Table Mountain at 33°57′S 18°24′E (1 ♀), 50 km N Cape Town (3 ♂, OÖLM), 60 km N Cape Town (1 ♂, OÖLM), Cederberg at 32°30′S 15°15′E (1 ♂, PPRI), 8 km SE Cederberg (2 ♂; 1 ♂, PPRI), Ceres (1 ♀, 7 ♂, BMNH; 1 ♀, 6 ♂, SAM), 43 km ENE Ceres (5 ♂, AMG), Citrusdal District (1 ♂, SAM), 20 km N Citrusdal (1 ♂, OÖLM), 40 km E Clanwilliam: Sevilla (1 ♀, 7 ♂, USU), 11 km W Clanwilliam: Ysterfontein Farm (2 ♂, USU), 18 km S Clanwilliam at 32°17′S 18°56′E (1 ♂, AMNH), Clanwilliam-Klawer (1 ♂, SAM), Dasklippas in Cederberg Mts. NE Porterville (4 ♀, 8 ♂, OHL), Dikbome Farm on Merweville-Koup road (1 ♂, SAM), Greyton (3 ♂, OÖLM), Huguenot (1 ♀, BMNH), Kliprand 60 km WNW

Loeriesfontein (3 ♀, 13 ♂, OÖLM), Konstabel Farm 30 km WSW Matjiesfontein (1 ♀, 1 ♂; 2 ♀, 5 ♂, SAM), 37 km SW Ladismith at 33°38′S 21°01′E (1 ♂, AMNH), Laingsburg (1 ♂; 1 ♀, AMG), 13 km ENE Laingsburg at 33°11′S 20°59′E (1 ♂), Langberg (7 ♂, OÖLM), Matjiesfontein (2 ♀, 1 ♂, BMNH), Merweville (3 ♀, 4 ♂, SAM), Mossel Bay (7 ♂, BMNH), Murraysburg District (1 ♂, SAM), Pearly Beach (2 ♀, 6 ♂, SAM), Rooinek in Laingsburg District (2 ♀, 19 ♂, SAM), Silvermine Nature Reserve in Cape Peninsula (2 ♂, BMNH), Swartrivier 7 km NW Prince Albert (2 ♂), Swellendam (1 ♂, FSCA), Tierberg Farm 23 km NE Prince Albert (4 ♂; 2 ♂, AMG) and 33°10′S 22°15′E (1 ♂), Touwsrivier (3 ♂, AMG), 18 mi SE Touwsrivier (1 ♂; 1 ♀, 1 ♂, AMNH, 1 ♂, KU), Uniondale (1 ♀, 2 ♂, PPRI; 2 ♀, SCHL), Vanrynsdorp at 31°36′S 18°43′E (2 ♂, AMNH), 10 km NE Vanrhynsdorp (2 ♂, OÖLM), Van Rhyn's Pass (1 ♀, 3 ♂, BMNH), Wellington: Rooshoek (4 ♀, 4 ♂; 1 ♂, AMG), 24 km W Worcester (1 ♂). **SPAIN**: **Alicante** (Torregrosa, Gayubo, Tormos, and Asís, 1993): Agost, Alicante, El Altet, Elche, Novelda, San Vicente del Raspeig. **Almería**: El Alquián (3 ♀, 1 ♂), Gérgal (1 ♂, CU), Laujar (1 ♀), Rambla de Tartala, Roquetas de Mar (2 ♂), R. Tabernas (Gayubo, Asís, and Tormos, 1990). **Badajoz**: Medellin (1 ♂), Merida. **Cadiz**: San Diego: Guadiaro. **Castellón de la Plana**: Burriana (Asís and Jiménez, 1988), La Llosa (Asís and Jiménez, 1988), Vallibona (Gayubo and Tormos, 1986). **Jaen**: Las Correderas. **Madrid** (Gayubo and Mingo, 1988): Madrid, Ribas de Jarama. **Málaga**: Málaga (2 ♂), Ronda. **Murcia**: Abanilla (Gayubo and Mingo, 1988), La Manga (1 ♀), Lorca (1 ♂). **Toledo**: Toledo. **Valencia**: Bétera, Dehesa de el Saler, Gandía (Gayubo and Tormos, 1984), Perellonet. **SUDAN**: Doka (1 ♀, GENOVA, det. *fluctuatus* by P. Magretti). **TAJIKISTAN**: Ayvaj near Djilikul. **TANZANIA**: **Arusha Region**: Tarangiri National Park (1 ♂). **Iringa Region**: 18 km W Iringa (1 ♂). **Kilimanjaro Region**: 18 km S Same (1 ♀, 1 ♂), 20 km SE Same (2 ♀). **Morogoro Region**: 62 road km SW Morogoro (1 ♀, 8 ♂). **Tanga Region**: 73 km NW Korogwe (7 ♀, 31 ♂; 4 ♂, MCZ; 2 ♀, 4 ♂, UDS), 84 km NW Korogwe 4°37.5′S 38°01.8′E (1 ♀, 1 ♂), 10 km WNW Mabokweni (2 ♀, 2 ♂), 22 km WNW Mabokweni (1 ♂), 2 km NE Mkomazi (3 ♀, 12 ♂), Pangani River Camp 86 km NW Korogwe (1 ♂). **Zanzibar Region**: Unguja (= Zanzibar Island): Mazi Moja (1 ♂, BMNH). **TOGO**: Sokodé (3 ♂, FSAG), 5 km W Sokodé (2 ♀). **TUNISIA**: 11 km S Jendouba at Mellègue River (2 ♀, CSE), E Kebili at 33°45.9′N 9°03.9′E (1 ♀, CSE), 3 km SW Matmata (1 ♀, CSE), 10 km SE Matmata at 33°30′N 10°01′E (1 ♀, CSE), 15 km W Nefta at 33°50′N 7°43′E (1 ♀, 1 ♂), Tabarka at 36°58′N 8°45′E (1 ♀, CSE), 3 km E Tabarka (1 ♂), 15 km E Tabarka at 36°58′N 8°55′E (1 ♀, 2 ♂, CSE). **TURKEY**: **Antalya**: Antalya (1 ♂, SCHL). **Mersin**: Kizkalesi–Ayas (1 ♂, CSE), W Silifke at 36°24.0′N 33°48.3′E (1 ♀, CSE). **TURKMENISTAN**: Akhcha-Kuyma near Djebel, Farab (1 ♀), Germab 55 km W Askhabad, Kerki (1 ♂), Repetek (1 ♂), Uzun Ada on e. shore of Krasnovodsk Gulf. **UGANDA**: Ngora (1 ♀, 1 ♂, CU). **UZBEKISTAN**: Ravat 60 km S Tashkent. **YEMEN** (Bingham, 1898): Lalaj, Sheikh Othman, also Al Kowd (4 ♀, ZMAN). **ZAIRE**: Biano in Shaba Province (1 ♀, BMNH), Kabalo (1 ♀, BMNH), 42 km E Kikwit (1 ♂). **ZAMBIA**: **Central Province**: Chibombo 97 road km N Lusaka (2 ♂), 14 km E Kapiri Mposhi (1 ♂), 25 km SSW Kapiri Mposhi (1 ♂). **Eastern Province**: 38 km W Kacholola (2 ♂), E side of Luangwa bridge (3 ♀, 4 ♂), mid-Luangwa Valley (2 ♀, BMNH), 6–18 km SW Mfuwe (1 ♀), 32 km E Petauke (1 ♂). **Northern Province**: near Mpulungu (1 ♂). **Southern Province**: 18 km NE Pemba (1 ♂, MSNT). **ZIMBABWE**: Beit Bridge (1 ♂, AMG), Bulawayo airport (3 ♀, 2 ♂), Dawn Mine 45 km NE Bulawayo (2 ♂), Hobo Ken in Umtali District (2 ♀, TMP), Kami Ruins (1 ♂), Leighwoods 52 km SW Bulawayo (1 ♀), Lion and Cheetah Park 24 km W Harare (1 ♂), Matetsi in Hwange District (4 ♀, 1 ♂, AMG), Matobo (1 ♀, 3 ♂, FSCA), Mt. Selinda (1 ♀, ANSP), 11 km NE Nyamandhlovu (3 ♀, 3 ♂), Redbank at Kami River (1 ♂), Sawmills (1 ♀, 1 ♂, AMG; 1 ♂, ANSP; 1 ♀, 1 ♂, CU; 1 ♂, PPRI; 3 ♀, 7 ♂, TMP; 1 ♂, ZMAN), Sawmills at Umguza River (1 ♀, 2 ♂), Victoria Falls (6 ♀, 2 ♂; 1 ♀, 2 ♂, NHMZ; 1 ♀, NRS).

Tachysphex ambiguus Arnold

Figures 18–19.

Tachysphex ambiguus Arnold, 1923:156, ♀, ♂. Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Spheciidae); Schouteden, 1930:91 (Zaire); Bohart and Menke, 1976:272 (listed).

Recognition.— *Tachysphex ambiguus*, an all black species, has a flat labrum, galea shorter than wide in lateral view, hindwing crossvein cu-a vertical, and apical tarsomeres without ventral

or lateral spines. It is further characterized by well-defined mesothoracic punctures and shiny interspaces; postocellar area wider than long; setae erect on postocellar area and on scutum anteriorly, suberect on midfemoral venter, and oriented anterolaterad on the propodeal dorsum. The female has a distinctive clypeus (Fig. 18a): the impunctate, obliquely oriented bevel meets the basomedian area at an angle (the apicomedian portion of the basomedian area is also impunctate); and the lip free margin is undulate. In the male, the clypeal lobe is narrow (corners closer to each other than to adjacent orbit), and the forefemoral notch is large, extending far on femoral anterior surface (Fig. 18c), largely glabrous, with an obtuse, longitudinal crest.

Description.— Mesothoracic punctures coarse, averaging about one diameter apart on scutal disk and near center of mesopleuron (some to many punctures may be several diameters apart); interspaces shiny. Propodeal dorsum irregularly, coarsely rugose, with tendency to form longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin carinate, carina somewhat expanded basally.

Setae (numbers in parentheses indicate setal length expressed as a fraction of basal mandibular width): sinuous, suberect on each side of oral fossa next to occipital carina (up to 0.5); erect, sinuous to practically straight on postocellar area, scutum anteriorly (up to 0.4 in female and 0.6 in male), and mesopleuron; straight, inclined anterolaterad on propodeal dorsum; suberect on midfemoral venter (longest setae 0.3).

Head, thorax, gaster, and legs black, mandible dark reddish mesally, tarsal apex reddish. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal vein brown and subcostal vein dark brown, or both veins dark brown. Terga I–III silvery fasciate apically.

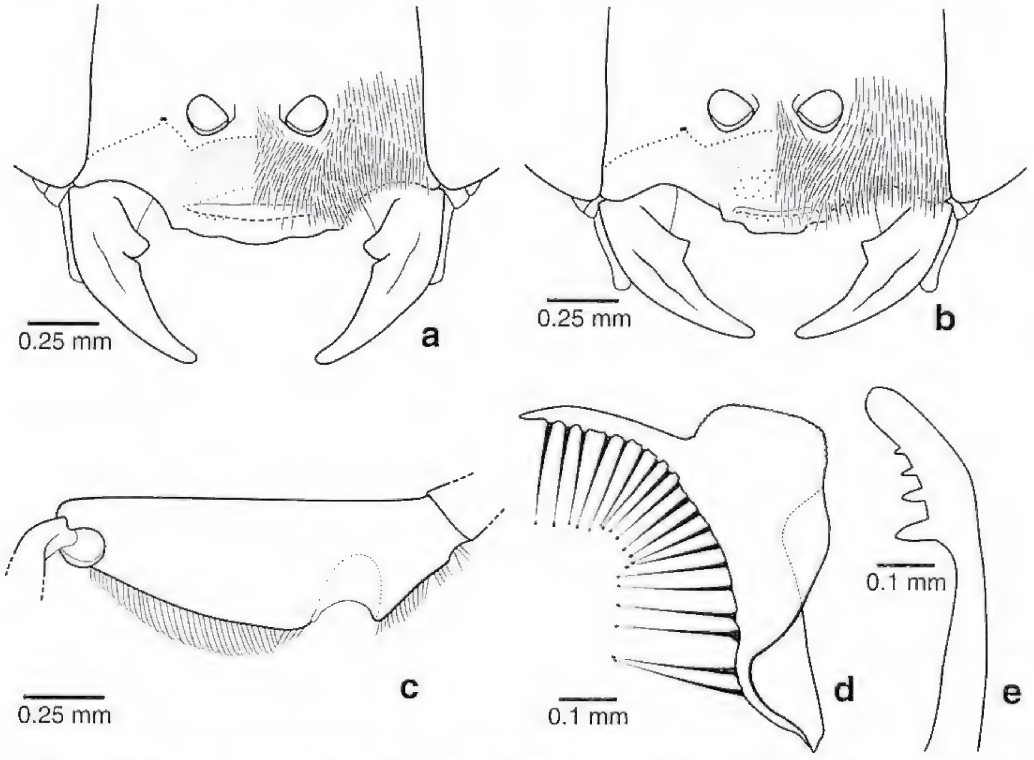

Figure 18. *Tachysphex ambiguus* Arnold: a – female clypeus; b – male clypeus; c – male forefemur; d – volsella; e – penis valve.

♀.— Clypeus (Fig. 18a): bevel slightly shorter than basomedian area, meeting the latter at an angle; lip free margin slightly, obtusely protruding mesally; broadly, shallowly concave adlaterally; and shallowly concave laterally (median projection and lateral concavity varying from prominent to inconspicuous). Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 2.4–2.6 × apical width. Dorsal foretibial surface with two or three inconspicuous spines, outer surface with thin spine near midlength. Forebasitarsus with 7–9 rake spines. Apical depression of tergum V narrow, varying from microsculptured, setose, to almost unsculptured, asetose. Pygidial plate microareolate and dull (except apically), with minute punctures that average many diameters apart. Length 9.8–11.6 mm.

♂.— Mandible: trimmal carina with tooth (Fig. 18b), cleft rudimentary or absent. Clypeus (Fig. 18b): bevel shorter than basomedian area, in most specimens somewhat stepped at lip base; lip free margin broadly, obtusely protruding mesally, broadly emarginate laterally, with well-defined corner; distance between corners 0.8 × distance between corner and orbit. Width of postocellar area 1.5–1.6 × length. Dorsal length of flagellomere I 1.6–1.8 × apical width. Forefemoral notch asetose, larger than average for *Tachysphex*, extending far on femoral anterior surface (Fig. 18c), largely glabrous, with longitudinal, obtuse crest, and proximal margin somewhat expanded (obtusely to sharply). Outer margin of forebasitarsus with varying number of rake spines (e.g., only apical spine present in single specimen from Serowe, Botswana; one apical and one subbasal in a specimen from Bulawayo, Zimbabwe; and four spines in specimen from St. Benedict, Zimbabwe, although the two intermediate ones are short, about as long as basitarsus width); outer apical spine of foretarsomere II shorter than tarsomere III. Tergum VII evenly, densely punctate throughout or punctures several diameters apart mesally. Length 7.0–8.8 mm. Volsella and penis valve: Figs. 18d, e.

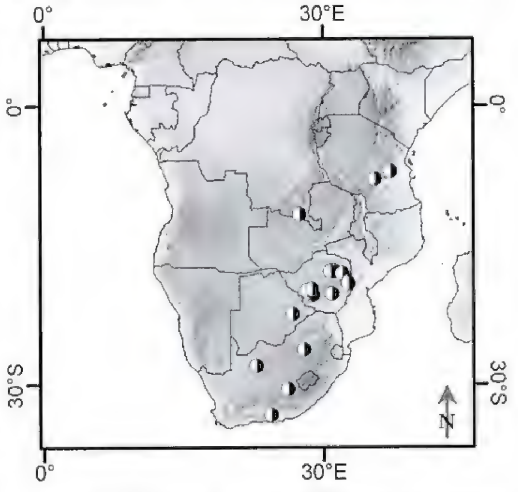

FIGURE 19. Collecting localities of *Tachysphex ambiguus*.

COLLECTING PERIOD.— 7 March through 12 September.

GEOGRAPHIC DISTRIBUTION (Fig. 19).— Tanzania to South Africa.

RECORDS.— **BOTSWANA**: Serowe (1 ♀, 1 ♂). **SOUTH AFRICA**: **Eastern Cape Province**: 3 km N Steytlerville (1 ♂, USU), 6 km N Steytlerville (2 ♂, USU). **Free State**: Tussen Die Riviere Game Reserve (1 ♀, 1 ♂, PPRI). **Gauteng**: Johannesburg: Melville Koppies Reserve (1 ♂, FSCA). **Northern Cape Province**: Olifantshoek at 27°57′S 22°48′E (1 ♂, PPRI). **Northern Province**: Afguns (1 ♂, AMG). **TANZANIA**: **Iringa Region**: 18 km W Iringa (1 ♀, 3 ♂). **Morogoro Region**: 62 road km SW Morogoro (2 ♀, 5 ♂). **ZAIRE**: Lubumbashi (Schouteden, 1930, as Elisabethville). **ZIMBABWE**: Bulawayo (1 ♂, AMG; 1 ♀, ANSP; 2 ♀, 2 ♂, SAM, including lectotype ♀ and paralectotype ♂ of *ambiguus;* 3 ♀, 1 ♂, TMP; 1 ♂, ZMAN), Bulawayo: Forestvale (1 ♂, SAM), Bulawayo: Redrups Hill (3 ♂, SAM), Bulawayo: Umguza River (2 ♂), Chishawasha (7 ♀, 2 ♂, BMNH), Dovenby Farm (1 ♀, SAM), Essexvale (1 ♀, AMG), near Harare [probably Chishawasha] (2 ♀, 4 ♂, RMNH), Hope Fountain (2 ♂, TMP; 4 ♂, SAM; 1 ♀, 1 ♂, ZMAN), Kami Ruins (5 ♂; 2 ♂, NHMZ; 2 ♀, 1 ♂, SAM; 1 ♀, 1 ♂, TMP), Kyle Lake (1 ♀), Lion and Cheetah Park 24 km W Harare (1 ♀), Nyamandhlovu (1 ♂, ANSP; 3 ♂, TMP), St. Benedict 30 km NE Macheke (1 ♂), Turk Mine (1 ♂, SAM), Umtali (1 ♂, AMG), Vumba Mts. (1 ♂, ANSP).

Tachysphex ambositrae Leclercq

Figures 20–21.

Tachysphex ambositrae Leclercq, 1967:67, ♀. Holotype: ♀, Madagascar: Ambositra (MNHN), examined.—Bohart and Menke, 1976:272 (listed); Pulawski, 2003:797 (in checklist of Malagasy Sphecidae).

Recognition.— The female of *ambositrae*, a Madagascan species, can be recognized by the following combination: postocellar area wide (width 2.0 × length), with erect setae (Fig. 20a); forefemoral venter shiny, with sparse punctures (Fig. 20c); gaster all red, nonfasciate, with segment VI somewhat flattened (Fig. 20d). The male is unknown.

Description (based on holotype only).— Mandible: outer ridge somewhat swollen and expanded over notch. Scutal punctures up to several diameters apart on disk. Mesopleuron dull, punctatorugose. Episternal sulcus complete, unusually deep below scrobal sulcus. Propodeal dorsum and side coarsely ridged. Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Sternum I: apical depression bisected by obtuse, longitudinal carina.

Setae erect on postocellar area and on each side of oral fossa next to occipital carina, about 1.5 × midocellar diameter long; oriented obliquely anterad on propodeal dorsum.

Head and thorax black, mandible dark reddish mesally. Frontal setae silvery (unknown in male). Wing membrane infumate; forewing costal and subcostal veins almost black. Legs black except tarsal apex reddish. Gaster red. Terga without silvery, apical fasciae.

♀.— Clypeus (Fig. 20b): basomedian area markedly convex; bevel slightly longer than baso-

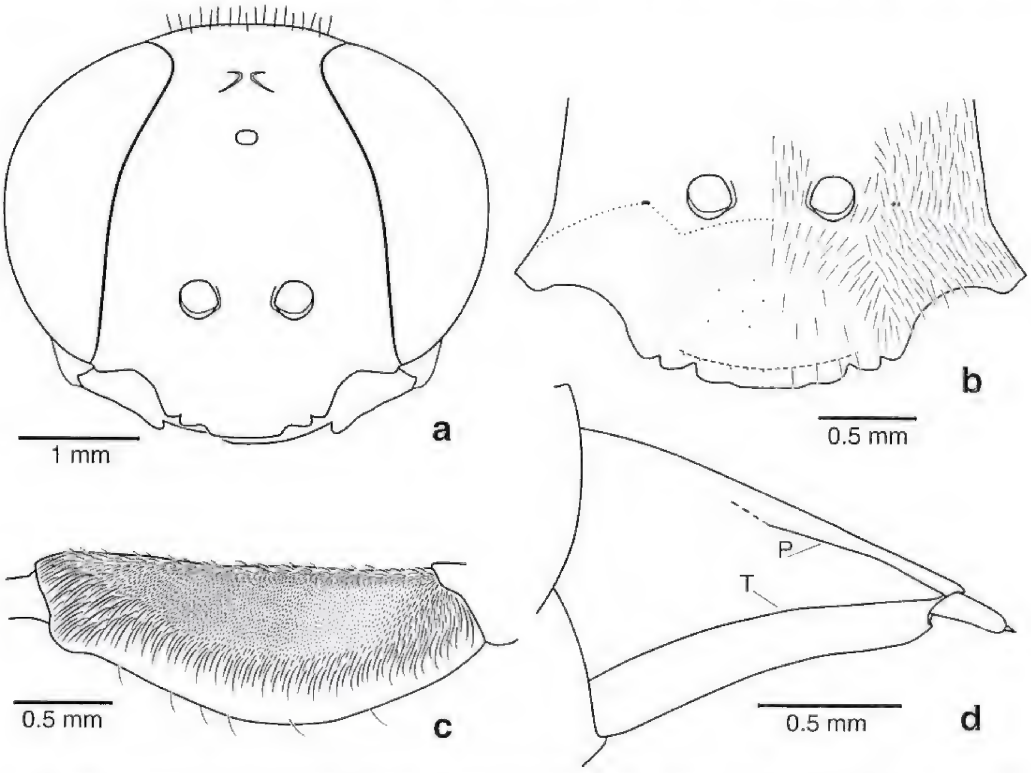

Figure 20. *Tachysphex ambositrae* Leclercq: a – female head in frontal view; b – female clypeus; c – female forefemur; d – gastral segment VI of female (P: lateral margin of pygidial plate, T: ventral margin of tergum VI).

median area; lip free margin arcuate, with two lateral incisions (and two teeth) on each side. Width of postocellar area 2.0 × length (Fig. 20a). Dorsal length of flagellomere I 2.6 × apical width. Scutum and scutellum slightly flattened. Midtrochanteral venter: punctures several diameters apart, interspaces unsculptured. Forefemoral venter with punctures that are several diameters apart (Fig. 20c), interspaces unsculptured. Foretibial outer surface with a few small fossae that suggest presence of spines (missing now), integument between fossae unsculptured, glabrous. Forebasitarsus with 14 rake spines. Apicoventral margin of apical tarsomeres convex. Terga IV and V: punctures several diameters apart, interspaces unsculptured, apical depression unsculptured. Tergum VI flatter than usual in the genus (Fig. 20d); pygidial plate sparsely punctuate, lateral margin effaced anteriorly. Length 15.0 mm.

♂.— Unknown.

GEOGRAPHIC DISTRIBUTION (Fig. 21).— Madagascar. Known from a single specimen collected by A. Seyrig in Ambositra in October 1928. The species may be extinct now as the natural habitat around Ambositra has been nearly completely lost to deforestation, conversion to agriculture, grazing, and grass fires, as I could see in March and April 1994.

RECORDS.— MADAGASCAR: Ambositra (1 ♀, MNHN, holotype).

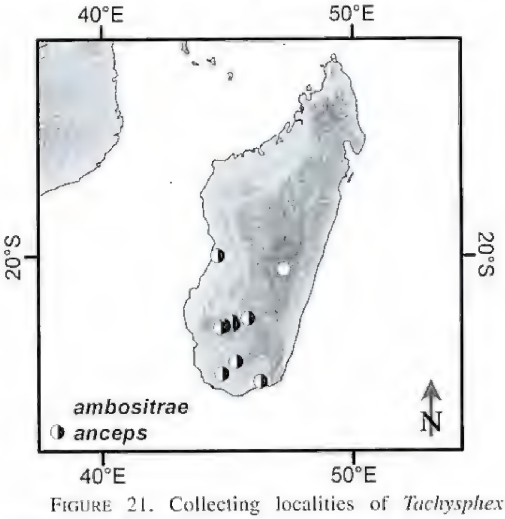

FIGURE 21. Collecting localities of *Tachysphex ambositrae* and *anceps*.

Tachysphex anceps Arnold

Figures 21–23.

Tachysphex anceps Arnold, 1945:102, ♀. Holotype: ♀, Madagascar: Bekily (MNHN), examined.— Bohart and Menke, 1976:272 (listed); Pulawski, 2003:797 (in checklist of Malagasy Sphecidae).

RECOGNITION.— *Tachysphex anceps*, an all black endemic of Madagascar, has the labrum flat, the mesopleuron with well-defined punctures, the setae straight, erect on the postocellar area, nearly erect on the scutum and on the midfemoral venter (as in Figs. 215e, f), inclined obliquely anterad on the propodeal dorsum, and the apical tarsomeres without spines on venter or lateral margin. Unlike *sexinus*, it has the usual, glabrous swelling above each antennal socket. Unlike *saturnus*, the notaulus is inconspicuous, and the scutal hindcorner is nonprominent.

The female of *anceps* has a clypeal lip with two lateral incisions on each side (Fig. 22a), and terga I–III fasciate apically. The female of *perniger* is similar, but the fasciae are present only on terga II and III and only laterally. The female of *seyrigi* differs in having minute mesopleural punctures.

The male of *anceps* can be recognized by the following combination: body black, clypeal lip roundly triangular (Fig. 22b), trimmal carina nondentate, and sterna III–VI largely impunctate anterad of apical depressions.

DESCRIPTION.— Scutal punctures averaging about one diameter apart in female, less than that in male, but in female some discal punctures up to several diameters apart. Mesopleural punctures well defined, averaging about one diameter apart; interspaces microsculptured. Episternal sulcus complete. Propodeal dorsum rugose, side ridged but ridges evanescent in some specimens (then

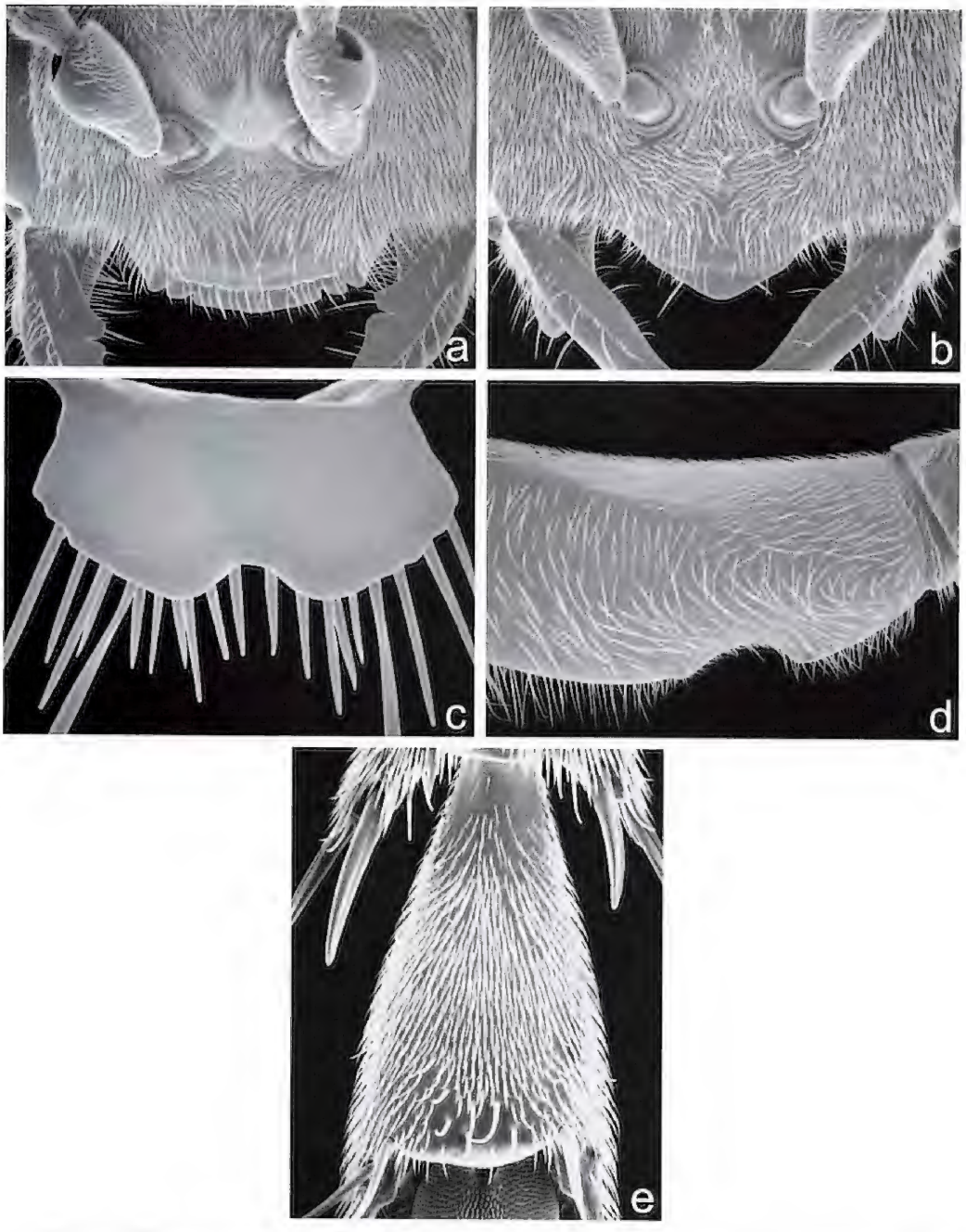

FIGURE 22. *Tachysphex anceps* Arnold: a – female clypeus (×41); b – male clypeus (×64); c – female labrum (×128); d – base of male forefemur (×120); e – apical hindtarsomere of female in ventral view (×180).

integument with easily recognizable punctures). Hindcoxal dorsum with inner margin carinate basally.

Setae erect, about one midocellar diameter long on postocellar area; erect, about 0.4 × basal mandibular width on each side of oral fossa next to occipital carina; suberect on scutum and midfemoral venter, about 1.5–2.0 × midocellar diameter; oriented obliquely anterad on propodeal dorsum.

Body all black except mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane moderately infumate; forewing costal and subcostal veins dark brown. Terga I–III in female, I–IV in male, silvery fasciate apically.

♀.— Labrum emarginate mesally (Fig. 22c). Clypeus (Fig. 22a): bevel longer than basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.2–1.4 × length. Dorsal length of flagellomere I 2.1–2.2 × apical width. Scutellum slightly flattened. Forefemoral venter uniformly, minutely punctate, punctures several diameters apart. Dorsal foretibial surface with one or two inconspicuous spines, outer surface with a few thin bristles. Forebasitarsus with 10–13 rake spines. Apicoventral margin of apical tarsomeres slightly arcuate (Fig. 22e). Tergum V (except laterally) with a few, sparse punctures; apical depression impunctate, glabrous. Pygidial plate with punctures that average several diameters apart; interspaces unsculptured. Length 8.5–9.0 mm.

♂.— Mandible: trimmal carina at most with obtusely angulate tooth remnant. Clypeus (Fig. 22b): bevel shorter than basomedian area; lip free margin roundly triangular, without corner (forming single curved line with rest of clypeal margin). Width of postocellar area 1.3–1.5 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width, equal to about 0.7 of II. Forefemoral notch smaller than average for the genus, setose to partly glabrous (Fig. 22d). Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Sterna III–VI largely impunctate anterad of apical depression. Length 5.0–7.0 mm. Volsella and penis valve: Fig. 23.

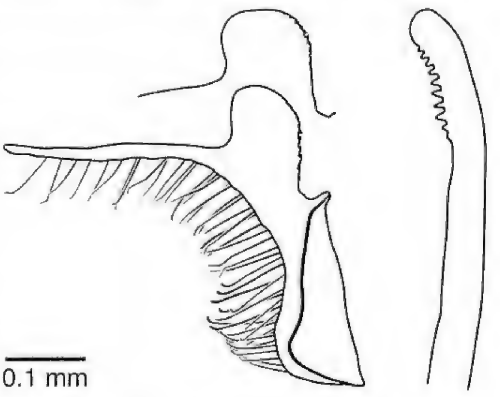

FIGURE 23. *Tachysphex anceps* Arnold: volsella and penis valve.

PREY.— The holotype female is pinned with a small nymphal gryllid, presumably her prey.

GEOGRAPHIC DISTRIBUTION (Fig. 21).— Madagascar.

RECORDS.— **MADAGASCAR**: **Fianarantsoa**: 40 road km W Ihosy (1 ♂), Isalo (1 ♀, BMNH), Isalo National Park at 22°36′S 45°10′E (3 ♂; 1 ♀, MSNT). **Toliara**: 22 km E Ampanihy at 24°41′S 44°46′E (1 ♂), Bekily (1 ♂, MNHN, holotype of *anceps*), Bereboka 60 km NE Morondava (2 ♂, BMNH), Berenty (3 ♀, 2 ♂; 4 ♀, 5 ♂, BMNH), Parc National de Zombitse at 22°50′36″S 44°42′36″E (1 ♀, 1 ♂), 38 km E Sakaraha (1 ♀, 10 ♂; 2 ♂, MSNT).

Tachysphex angustus Arnold, new status

Figures 24–25.

Tachysphex hermia var. *angustus* Arnold, 1924:54, ♂. Holotype: ♂, Zimbabwe: Bulawayo (SAM), examined.— As *Tachysphex hermia angustus*: Bohart and Menke, 1976:274 (new status, listed).

RECOGNITION.— *Tachysphex angustus*, an all black southern African species, has conspicuous

scutal and mesopleural punctures, a flat labrum, a galea shorter than wide in profile, hindwing crossvein cu-a vertical, setae erect on the postocellar area and midfemoral venter and diverging anterad from midline on the propodeal dorsum, and unspecialized tarsi (length of midtarsomere II more than twice width and that of hindtarsomere IV greater than width, apical tarsomeres without spines on venter or lateral margins).

The female of *angustus* has a slightly concave postocellar area (Fig. 24a); clypeal lip not emarginate laterally (Fig. 24c), mesopleuron with well-defined punctures and shiny interspaces; setae appressed on the hindfemoral venter; and tarsomeres IV not elongate (e.g., length of hindtarsomere IV 1.2–1.4 × apical width). It can be distinguished with some difficulty from *titania*, in which the postocellar area is flat or nearly so and the galea is slightly longer than wide in profile (Fig. 393). The female of *longipes* is also similar, but has the mesopleuron dull, punctatorugose, setae erect on the hindfemoral venter (Fig. 215e), and tarsomeres IV elongate (e.g., length of hindtarsomere IV 1.7 × apical width).

The male of *angustus* has a distinctive clypeus whose middle section is convex and whose lip is essentially truncate (varying from slightly arcuate or sinuate to nearly truncate), with corner either obtuse or well defined (Fig. 214b). The sinuous setae of the postocellar area help in recognition.

Description.— Scutal and mesopleural punctures well defined, conspicuous, on scutal disk and near center of mesopleuron varying from less than to more than one diameter apart; interspaces shiny. Propodeal dorsum rugose, in many specimens also with longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I, in some specimens, with short, median carina on apical depression.

Setae erect or suberect on postocellar area, lower gena, thorax, fore- and midfemoral venters, diverging anterolaterad from midline on propodeal dorsum, not concealing integument; sinuous on postocellar area, sinuous or straight on lower gena, scutum anteriorly, and mesopleuron. Setal length, expressed as a fraction of basal mandibular width, about 0.7–1.0 on postocellar area and adjacent to hypostomal carina, about 0.2–0.4 on midfemoral venter.

Head, thorax, gaster, femora, and tibiae black, mandible reddish at about two thirds of length, tarsal apex brown or reddish. Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal vein of forewing brown, subcostal vein dark brown. Terga I–IV (I–V in some males) silvery fasciate apically.

♀.— Clypeus (Fig. 24c): bevel slightly shorter to slightly longer than basomedian area; lip arcuate to straight, not incised laterally, in many specimens inconspicuously angulate mesally. Postocellar area slightly concave (Fig. 24a), its width 1.2–1.5 × length in most specimens, but 2.2 × length in single female from Loeriesfontein. Dorsal length of flagellomere I 2.6–2.8 × apical width; middle flagellomeres longer than average for the genus (e.g., dorsal length of flagellomere IV 3.2–3.6 × apical width). Distal half of forefemoral venter with punctures up to several diameters apart; all forefemoral venter with minute punctures that are many diameters apart in female from Loeriesfontein. Dorsal foretibial surface with two inconspicuous spines, outer surface with one or two spines. Forebasitarsus with 5–7 rake spines. Tergum V microsculptured and setose throughout, including apical depression. Pygidial plate aciculate, with punctures that average many diameters apart. Length 8.5–10.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 24d): middle section markedly convex; bevel varying from about as long as basomedian area to nearly reduced; lip free margin varying from slightly arcuate or sinuate to nearly truncate, with well-defined but nonprominent corner; distance between corners 0.8–1.0 × distance between corner and orbit. Width of postocellar area 1.9–2.2 × length (Fig. 24b). Dorsal length of flagellomere I 1.2–1.4 × apical width.

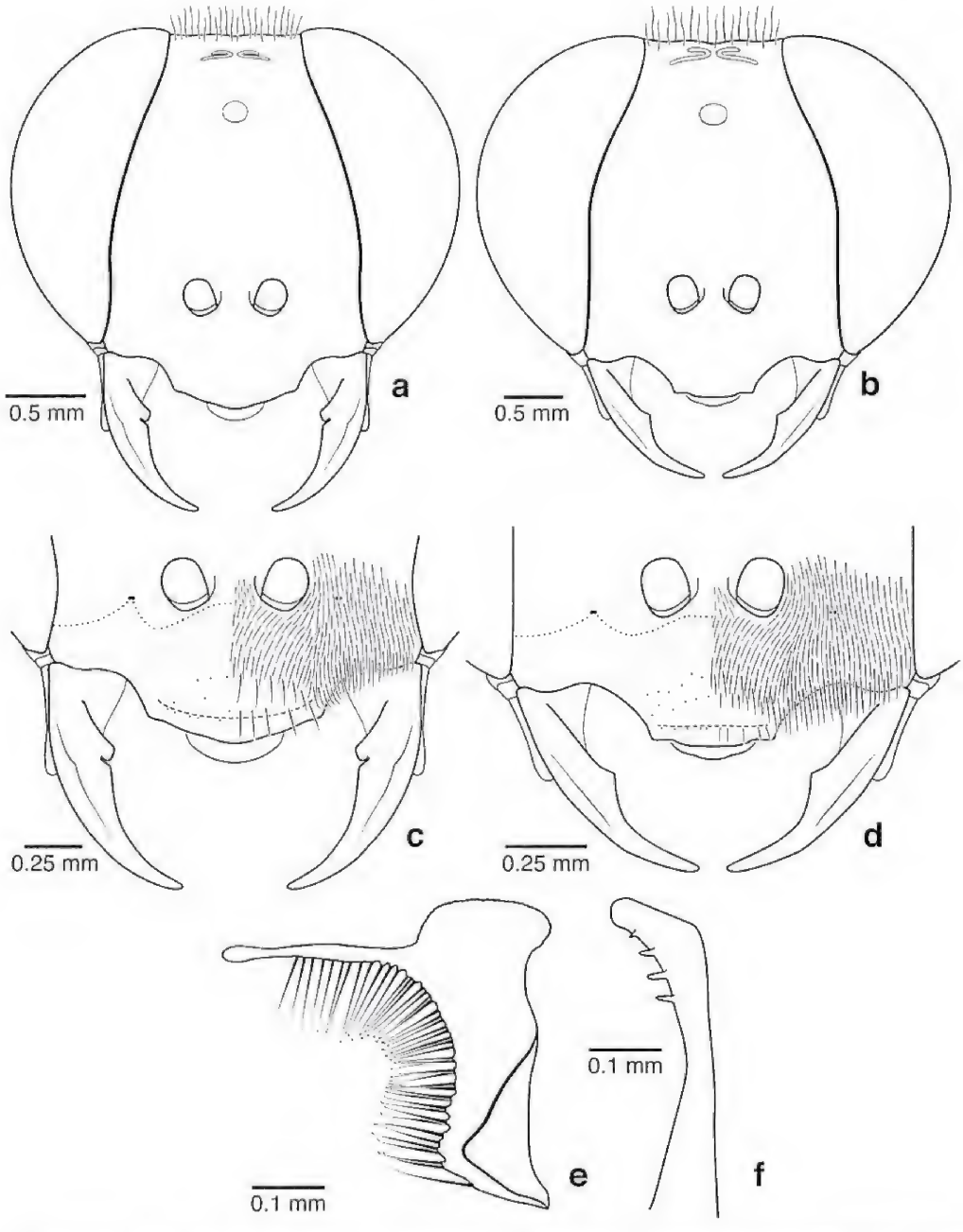

FIGURE 24. *Tachysphex angustus* Arnold: a – female head; b – male head; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

Forefemoral notch microscopically setose, smaller than average for the genus in Namibian specimens. Outer margin of forebasitarsus mostly without preapical spines, occasionally with one such spine; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length 6.0–7.1 mm. Volsella and penis valve: Figs. 24e, f.

Floral records.— The specimens collected in Homeb area, Namibia, were visiting flowers of *Welwitschia mirabilis* J.D. Hooker; those collected between Aus and Rosh Pinah were visiting pink flowers of *Galenia* sp. (Aizoaceae); and that collected east of Skeleton Coast Park was visiting flowers of *Zygophyllum simplex* Linnaeus, as noted by the collectors, F.W. and S.K. Gess.

Geographic distribution (Fig. 25).— Namibia to Zimbabwe and South Africa, also Tanzania.

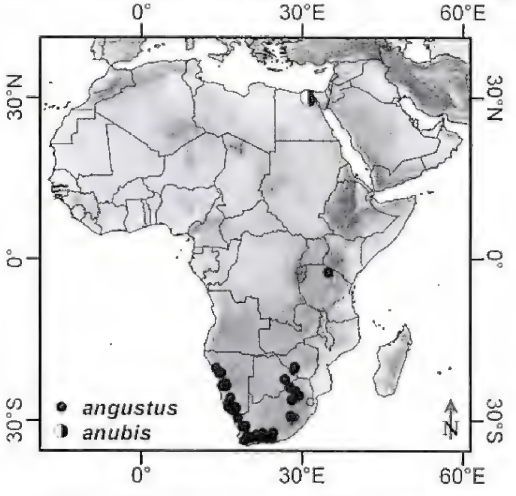

FIGURE 25. Collecting localities of *Tachysphex angustus* and *anubis*.

Records.— **BOTSWANA**: **Serowe**: Farmers Brigade (2 ♂, PPRI). **LESOTHO**: Mamalapi Mtn. (1 ♂, AMG), Mamathes (2 ♂, AMG). **NAMIBIA**: **Bethanie District**: Barby Farm 25 mi W Helmeringhausen (1 ♂, BMNH). **Karasburg District**: Fish River Canyon (2 ♂, AMG, CAS), Fish River Canyon 18 km E Ai Ais at 27°57′03″S 17°32′35″E (1 ♀; 2 ♀, CSE). **Khorixas District**: Brandberg: Hungorob River (1 ♀, 3 ♂, SAM), Hungorob River mouth (4 ♂; 1 ♀, 5 ♂, SAM), Messum Valley (1 ♂, SAM), and Wasserfallfläche (1 ♀, SAM), road 3245 E Skeleton Coast Park at 20°14′S 13°53′E (1 ♀, AMG), 120 km from coast on road to Uis Myn (3 ♂, AMG). **Lüderitz District**: Aus (1 ♂; 4 ♀, 1 ♂, BMNH), Aus to Rosh Pinah at 26°50.1′S 16°17.6′E (3 ♀, AMG), Uguchab River near Aurusberg (2 ♀, CAS, PPRI). **Omaruru District**: Messum River (1 ♀, 1 ♂, SAM). **Swakopmund District** (all in Namib/Naukluft Park): Ganab (1 ♀, 1 ♂; 1 ♂, PPRI), Homeb ESE Gobabeb (2 ♀, ZMUC), N Homeb (1 ♀, 1 ♂; 3 ♀, 1 ♂, PPRI), Kuiseb River near Gobabeb (8 ♀, 2 ♂, PPRI), Mirabeb (1 ♂, PPRI), Namib Desert at 23°38′S 15°41′E (4 ♂, PPRI), Namib Desert Research Station (2 ♀, USU). **Windhoek District**: Gaub River at 23°29′12″S 15°46′08″E (1 ♂, CSE). **SOUTH AFRICA**: **Eastern Cape Province**: Graaff-Reinet (1 ♀, BMNH), 6 km N Steytlerville (4 ♂, USU), Willowmore (2 ♂, TMP), 37 km NW Willowmore in Grootrivierberg Range (4 ♂, USU). **Gauteng**: Johannesburg: Cyrildene (1 ♀, AMG) and Mondeor Hills (1 ♀, AMG). **Mpumalanga**: O.T.K. [= Oostelike Transvaalse Koöperasie] Reserve near Loskop Dam Nature Reserve (1 ♂, PPRI). **Northern Cape Province**: SW Loeriesfontein (1 ♀, 1 ♂, OÖLM), Middelpos (1 ♂, FSCA), Richtersveld National Park at 28°05′S 16°57′E (1 ♀, AMG). **Northern Province**: Afguns (1 ♀, AMG), Mogol Nature Reserve (1 ♂; 3 ♂, PPRI), 10 km SW Naboomspruit (1 ♂, FSCA). **Western Cape Province**: Beukesfontein at 32°53′S 19°44′E (1 ♀, PPRI), Karoo National Park in Beaufort West (1 ♂, PPRI), Knersflakte: Kalkgat (1 ♀, 2 ♂, SAM), Matjiesfontein (1 ♀, 1 ♂, BMNH), Merweville (1 ♀, PPRI), Swartrivier 7 km NW Prince Albert (1 ♂), Tierberg Farm 23 km NE Prince Albert (1 ♂, OHL), 24 km W Worcester (1 ♂, USU). **TANZANIA**: **Mara Region**: Seronera in Serengeti National Park (1 ♂). **ZIMBABWE**: Bulawayo (1 ♀, AMG; 1 ♂, SAM, paratype of *angustus*), Bulawayo: Hillside (1 ♂, SAM, holotype of *angustus*), Bulawayo at Umguza River (1 ♂, paratype of *angustus*), Matobo (1 ♀, BMNH).

Tachysphex anubis Pulawski

Figures 25–26.

Tachysphex anubis Pulawski, 1964:98, ♀, ♂. Holotype: ♀, Egypt: Abu Rawash near Cairo (CAS), examined.— Pulawski, 1971:196 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:272 (listed).

Recognition.— *Tachysphex anubis*, known only from Lower Egypt, has a flat labrum (not protruding beyond clypeal free margin), hindwing crossvein cu-a vertical, and simple tarsi (midtarsomere II more than twice as long as apically wide, apical tarsomeres without spines on venter or lateral margins). It is further characterized by well-defined mesopleural punctures with shiny interspaces, setae erect on the postocellar area, suberect on the midfemoral venter, and inclined anterad on the propodeal dorsum. In addition, the wing veins are all pale yellowish brown, the lateral section of the female clypeus has the free margin practically straight, not concave (Fig. 26a), and the outer apical spine of male foretarsomere II is longer than foretarsomere III.

Tachysphex anubis shares the above character combination with *yarrowi*, but differs in having a nonprominent scutal hindcorner, punctures near the center of the mesopleuron less than one diameter apart, setae denser on the mesopleuron than on the metapleuron, in the female the postocellar area flat and the midtrochanteral venter densely punctate, and the male clypeal lip obtusely pointed and without lateral corner (Fig. 26b). In *yarrowi*, the scutal hindcorner is slightly prominent, punctures near the center of the mesopleuron are more than one diameter apart, setae are as dense on the mesopleuron as on the metapleuron, in the female the postocellar area is concave and the midtrochanteral venter has only a few, sparse punctures, and the male clypeal lip is evenly arcuate and with an obtuse lateral corner (Fig. 416b).

Description.— Scutal punctures well defined, up to 2–3 diameters apart near center; interspaces unsculptured, shiny. Mesopleural punctures fine, less than one diameter apart; interspaces shiny. Punctures of mesothoracic venter (except near midline) up to many diameters apart. Propodeal dorsum finely, irregularly rugose, in many specimens also with irregular, longitudinal ridges; side finely ridged (ridges effaced or nearly so in some specimens). Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, longer than midocellar diameter; suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; suberect on scutum; dense, largely concealing integument on mesopleuron but contrastingly sparser on metapleuron; suberect on midfemoral venter, about equal to midocellar diameter; inclined anterad on propodeal dorsum. Setae of tergum I appressed, longer and denser than average for the genus.

Head and thorax black, mandible yellowish red in female, reddish to brown in male, at about two thirds of length. Frontal setae silvery in both sexes. Wing membrane nearly hyaline; costal and subcostal veins of forewing pale yellowish brown. Femora all black or female hindfemur narrowly reddish apically. Fore and midtibiae black, reddish apically; hindtibia reddish except brown or black ventrally. Gaster black, in most females terga I and II and sternum II reddish, at least laterally; in most males terga I and II reddish laterally, also tergum I mesally in some; apical depressions of terga translucent. Terga I–V silvery fasciate apically.

♀.— Clypeus (Fig. 26a): bevel slightly shorter than basomedian area; lip free margin arcuate or slightly sinuate, not incised laterally. Width of postocellar area 1.6–1.8 × length. Dorsal length of flagellomere I 1.9–2.2 × apical width. Dorsal foretibial surface without spines or with one inconspicuous, preapical spine, outer surface with one, thin spine. Forebasitarsus with four or five (mostly five) rake spines. Apical depression of tergum V setose. Pygidial plate aciculate or unsculptured except for a few, evanescent punctures. Length 4.4–5.3 mm.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 26b): bevel about as long as basomedian area; lip free margin obtusely pointed, without corner, forming single curved line with rest of clypeal margin; minute oblique carina emerging from lip outer margin (distance between insertion points of the carinae equal to about 0.9 of distance between each carina and corresponding orbit). Width of postocellar area 2.2–2.4 × length. Dorsal length of flagellomere I 1.1–1.3 × apical width, equal to about 0.8 of II. Forefemoral notch with bottom microscopically

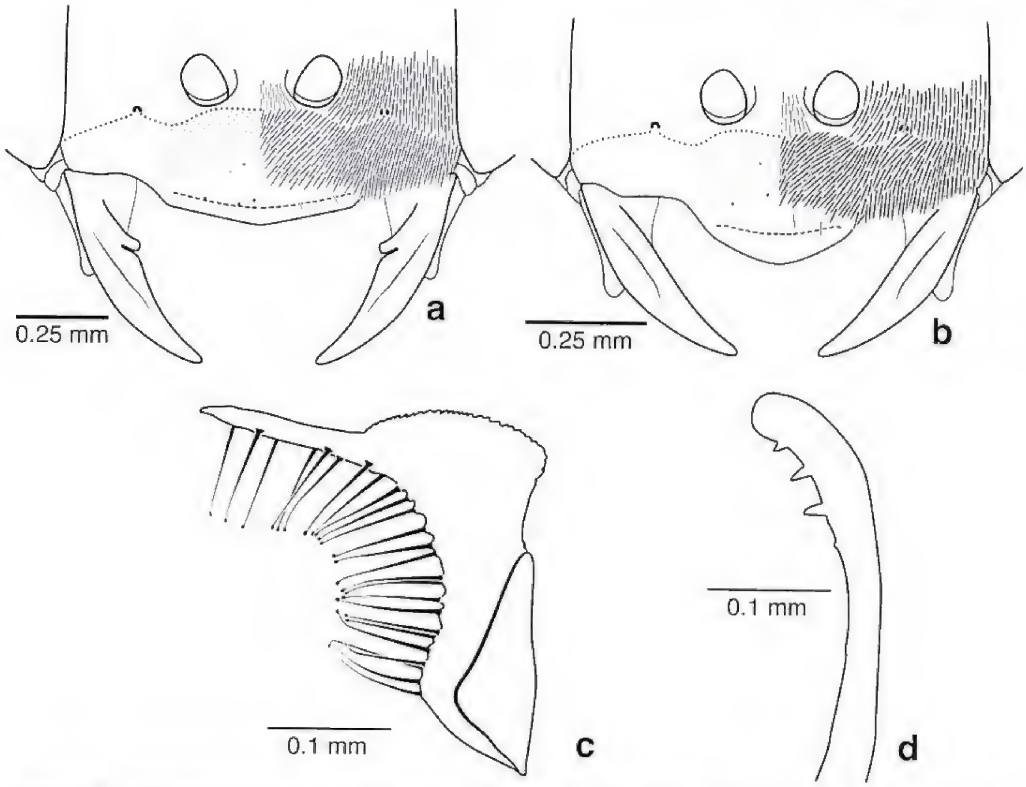

FIGURE 26. *Tachysphex anubis* Pulawski: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

setose. Outer margin of forebasitarsus with two preapical rake spines (one near midlength); outer apical spine of foretarsomere II longer than tarsomere III. Apical margin of sternum VIII in some specimens with low, obtuse median tooth. Length 3.5–4.2 mm. Volsella and penis valve: Figs. 26c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 25).— Lower Egypt.

RECORDS.— **EGYPT: Al Jizah** (= Ghiza): Abu Rawash (8 ♀, 8 ♂, holotype and paratypes of *anubis*), Manshiet Radwan (1 ♀).

Tachysphex argentatus Gussakovskij

Figures 27, 28.

Tachysphex argentatus Gussakovskij, 1952:242. ♀, ♂ (♀ = *Tachysphex erythrophorus*). Lectotype: ♂, Tajikistan: Stalinabad, now Dushanbe (ZIN), designated by Pulawski, 1967:398, examined before 1971.— Pulawski, 1967:398 (Turkey, description of ♀), 1971:369 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Bohart and Menke, 1976:272 (listed); Kazenas, 1978b:115, 128 (in key to Sphecidae of Kazakhstan and Central Asia); Nazarova, 1998:40 (Tajikistan); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002:65 (Kazakhstan).

As *Tachytes rufiventris*: Magretti, 1884: 587 (Eritrea), **present correction**.

RECOGNITION.— The female of *argentatus* is characterized by an unusually broad, broadly rounded apically pygidial plate (Fig. 27c) that is almost unsculptured basally except for a few,

sparse punctures, a vertical hindwing crossvein cu-a, a membranous galea. Additional recognition features include a gaster red at least basally, mesopleuron dull, with ill-defined punctures that are nearly contiguous, mesopleural setae largely (but not fully) concealing the integument, mesothoracic venter closely punctate, hindfemoral outer surface with dense, reflective setae at least ventrally, and maxillary stipes with a few, inconspicuous setae. *Tachysphex incanus* is almost identical, but in *argentatus* the free margin of the clypeal lip is either evenly arcuate or has a small, obtuse point, and the cleft of the trimmal carina is narrow (Fig. 27a). In *incanus*, the tip of the clypeal lip is slightly larger and the cleft of the trimmal carina is broader (Fig. 191a).

The male can be recognized by the following: sterna IV–VII largely impunctate and glabrous, hindwing crossvein cu-a vertical, galea membranous, clypeal lobe corners well defined and closer to each other than to the corresponding eye (distance between corners about 0.6–0.9 of that between a corner and adjacent orbit), free margin concave between midpoint and corner (Fig. 27b), mesopleuron dull, with ill-defined punctures that are nearly contiguous, mesopleural setae largely concealing integument, forefemoral notch with well-defined, microscopically setose platform, outer margin of forebasitarsus with four or five rake spines, and gaster red at least basally. Unlike *deserticola* and *vestitus*, the frons of *argentatus* is the usual shape, not particularly convex.

Description.— Galea membranous. Scutal punctures well defined, less than one diameter apart. Mesopleural punctures shallow, nearly contiguous, interspaces dull. Propodeal dorsum evenly microareolate, side microsculptured or minutely ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum (including anteriorly); angled apically or somewhat sinuous on each side of oral fossa next to occipital carina, about as long as 0.3 of basal mandibular width; on mesopleuron largely but not completely concealing integument; oriented mainly posterad on propodeal dorsum, but oriented anterad in a specimen from Arava Valley, Israel; outer surface of female hindfemur with dense, reflective setae, at least near ventral margin.

Head and thorax black but mandible yellowish red (except distally) and pronotal lobe yellowish at least posteriorly. Frontal setae silvery in both sexes. Wing membrane nearly hyaline; costal vein of forewing light brown, subcostal vein brown (all or largely so). Fore- and midfemora varying from black (except apically) to red, hindfemur red except mostly black in some females; tibiae and tarsi red. Gaster all red or with black tip in female and segments IV–VII brown in male. Terga I–IV silvery fasciate apically (I–V in some males).

♀.— Clypeus (Fig. 27a): bevel slightly convex, varying from about 0.3 × length of basomedian area to nearly as long as basomedian area, partly concealed by setae that originate dorsad of it; lip free margin with ill-defined, obtuse teeth mesally, somewhat concave laterally. Width of postocellar area 0.5–0.6 × length. Dorsal length of flagellomere I 2.1–2.8 × apical width. Dorsal foretibial surface with three spines, outer surface with a few spines. Forebasitarsus with 7–9 rake spines. Apical tarsomeres each with one subbasal and one preapical small spine on venter. Preapical setae of segment V thickened. Tergum V next to apical depression nearly unsculptured except for a few, sparse punctures; apical depression unsculptured, glabrous. Pygidial plate unusually broad, broadly rounded apically, with two differently sculptured areas: anteriorly unsculptured except for a few, sparse punctures, posteriorly dull, either with microscopic longitudinal ridges or apparently unsculptured (Fig. 27c); the two areas mostly separated by transverse groove (that corresponds to ridge on internal surface), but groove absent in a female from Wadi Digla, Egypt (Pulawski, 1971). Length 6.0–11.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 27b): bevel absent (dense, uniform punctuation extending to lip base); lip free margin prominent mesally (inconspicuously so in many specimens), at least shallowly concave between midpoint and corner (which is well

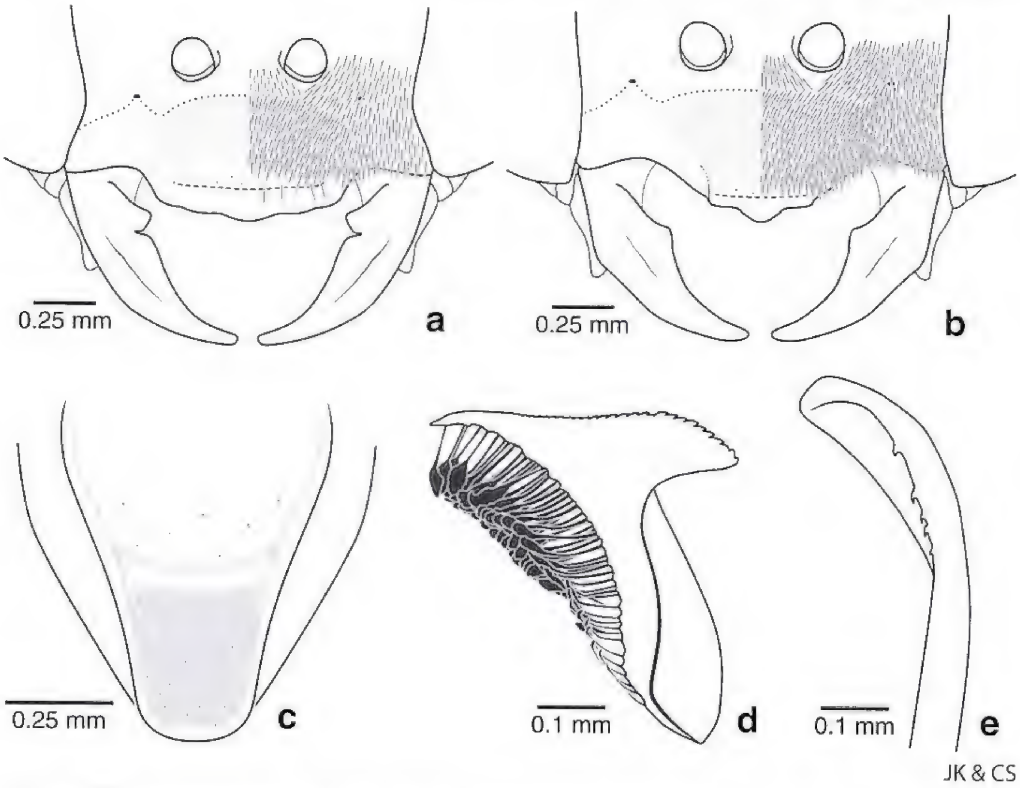

FIGURE 27. *Tachysphex argentatus* Gussakovskij: a – female clypeus and mandible; b – male clypeus and mandible; c – pygidial plate of female; d – volsella; e – penis valve.

defined); distance between corners 0.6–0.9 × distance between corner and orbit. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 1.6–2.1 × apical. Forefemoral notch with well-defined, microscopically setose platform. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III; apical tarsomeres with ventral spine near center. Tergum VII, near base, with punctures that are one or more diameters apart. Sterna IV–VII impunctate and glabrous except on anterolateral area that becomes smaller toward gastral apex (but with usual, erect setae at base of apical depressions). Length 5.6–7.6 mm. Volsella and penis valve: Figs. 27d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 28).— Mali and Eritrea north to Turkey, Arabian Peninsula east to southern Kazakhstan and Tajikistan.

RECORDS.— EGYPT: **Al Qahirah** (= Cairo): Katamia area 40 km E Maadi (1 ♀), Wadi Digla (Pulawski, 1971), Maadi (1 ♂). **Al Suways** (= Suez): Wadi Hagul 30 km SW Suez (1 ♀, 1 ♂). **Sina** (= Sinai): 8 km SE El Thamad (1 ♂), Wadi Sudr 50 air km SE Suez (1 ♀, 2 ♂; 2 ♂, MSNT). **ERITREA**: Khor Cheru (1 ♀, GENOVA, det. *Tachytes rufiventris* by P. Magretti). **ISRAEL**: Beersheba (Pulawski, 1971), 135 km N Elat Iddan (1 ♂, CSE), En Gedi (1 ♂), Hazewa in Arawa Valley at 30°46.88′N 35°14.56′E (1 ♀, CSE), Mezad Aqrabbim 45 km SE Beersheba (1 ♀, CSE), Qetura Kibbutz in Arava Valley (2 ♂, UCD). **KAZAKHSTAN**: **Qyzylorda**: 3 km NW railroad station Kamyshlybash (1 ♀), village Priaral'skoye 10 km NNW railroad station Kamyshlybash (1 ♂). **Zhambyl**: 40, 50, and 60 km NW Furmanovka (3 ♂). **MALI**: Anefis (1 ♂, KMG). **OMAN**: Al Bagriya 23°32.3′N 58°31.3′E (2 ♂), Behla (1 ♂, KMG), Rostaq (1 ♀, KMG). **SYRIA**: Duma 10 km NE Damascus (Pulawski, 1971), Mezze 4 km W Damascus (Pulawski, 1971), Wadi Raqqad in south-

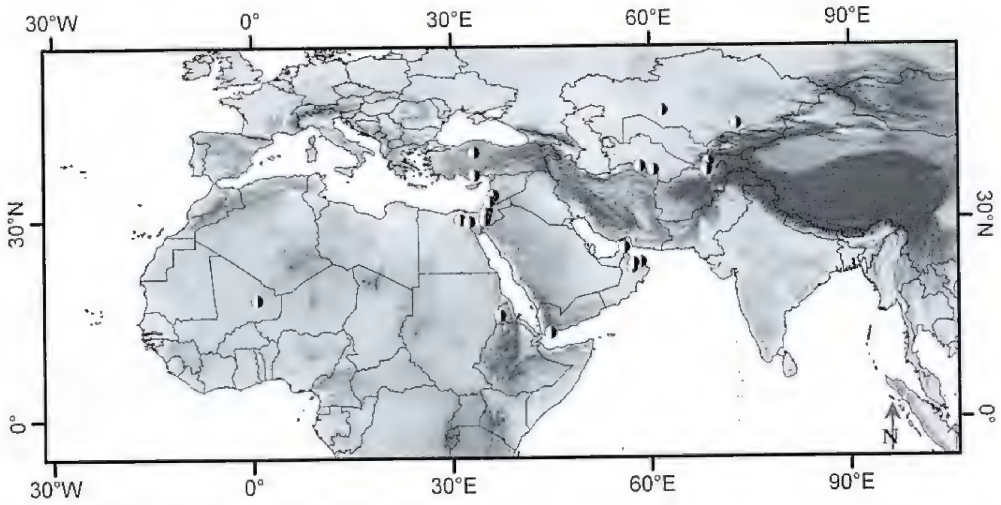

FIGURE 28. Collecting localities of *Tachysphex argentatus*.

ern Syria (1 ♂). **TAJIKISTAN** (Pulawski, 1971): Djilikul, Dushanbe, Kabadian, Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TURKEY**: **Ankara**: Kalecik at Kizilirmak River (1 ♂). **Mersin**: Köselerli 48 km NW Silifke at 36°38′N 33°27′E (1 ♀), Mut (Pulawski, 1971). **TURKMENISTAN**: 10 km W Askhabad (1 ♂), Komarovskiy ca 10 km E Askhabad (Pulawski, 1971), Tedjen (2 ♂). **UNITED ARAB EMIRATES**: W Bih (1 ♂, KMG). **YEMEN**: Lahj (1 ♂; 2 ♀, 2 ♂, RMNH; 1 ♀, 2 ♂, ZMAN).

Tachysphex argenticeps Arnold

Figures 29–32.

Tachysphex argenticeps Arnold, 1959:328, ♂. Holotype: ♂, Tanzania: Itumba in Rukwa Valley (BMNH), examined.— Bohart and Menke, 1976:272 (listed).

RECOGNITION.— The female of *argenticeps* has an unusually broad pygidial plate, sharply divided into an essentially unsculptured, shiny basal part and a microsculptured, dull apical part (Figs. 29c, d, 30b), and a distinctive clypeus: the lobe free margin has six obtuse teeth (Fig. 29a), although the admedian or lateral teeth may be fused, and all teeth may disappear in worn specimens.

In the male, sterna III–VI are largely impunctate and glabrous, the outer margin of forebasitarsus has four or five spines, and the clypeal lobe is narrow (corners closer to each other than to orbit), with a median projection that varies considerably in shape. Additionally, at least the gastral base and the hindfemur are red. Several other species are similar (e.g., *argentatus*, *julliani*, *mauretanus*), but *argenticeps* differs in having well-defined mesopleural punctures (punctures partly confluent in some specimens). The male of *prosopigastroides* is also similar, but in *argenticeps* the setae of the head and thorax are appressed or nearly so and not sinuous, the supraantennal swelling is the usual shape (nonprominent), and the scutum and mesopleuron have well-defined punctures. In *prosopigastroides*, the setae of the head and thorax are sinuous, conspicuously suberect to erect, the supraantennal swelling is prominent, triangular in lateral view (Fig. 289c), and the scutum and mesopleuron are coarsely punctatorugose.

TYPE LOCALITY.— The type locality given in the original description may be incorrect. The locality Itumba, NNE of Rungwa, Singida Region, is a great distance from Lake Rukwa. The two streams named Itumba, Mbeya Region, are closer to Lake Rukwa, but not exactly in this lake's valley either.

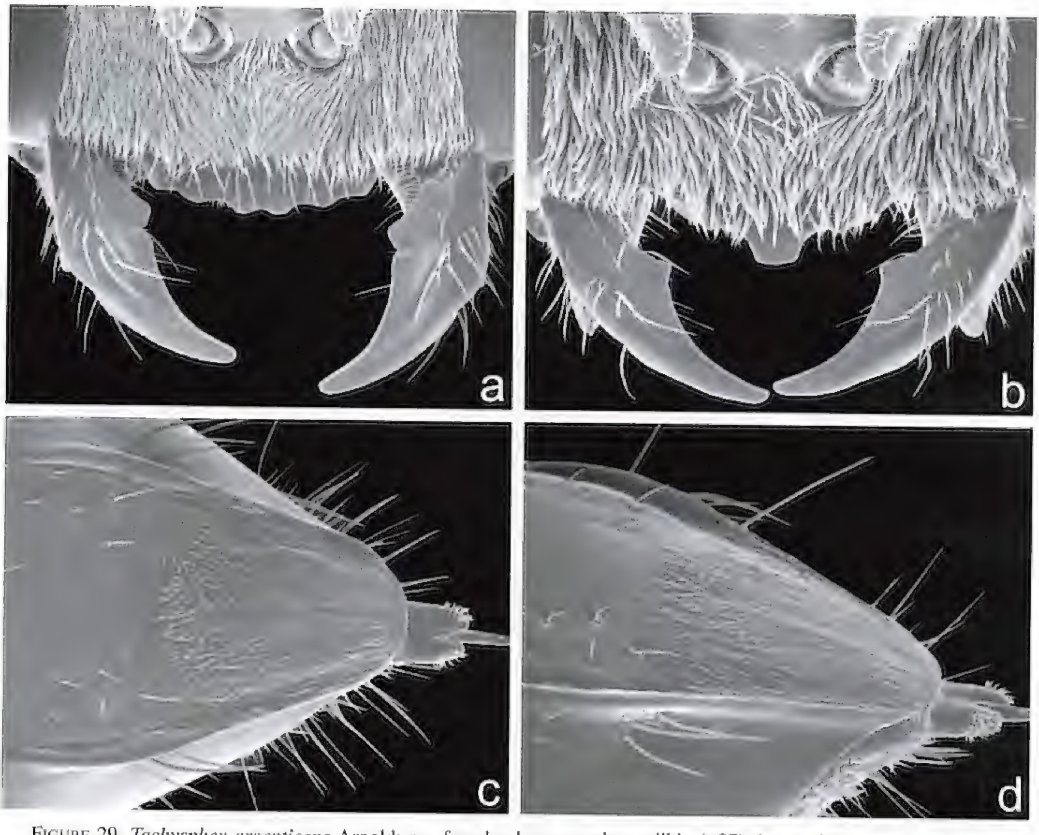

FIGURE 29. *Tachysphex argenticeps* Arnold: a – female clypeus and mandible (×37); b – male clypeus and mandible (×61); c – female pygidial plate in dorsal view (×80); d – same, lateral oblique view.

DESCRIPTION.— Galea membranous. Mandible: outer ridge somewhat swollen and expanded over notch. Scutal punctures well defined, conspicuous; discal punctures averaging from about one to about two diameters apart. Mesopleural punctures large, well defined in most specimens (averaging less than one diameter apart at center), but partly confluent in some. Punctures of mesothoracic venter varying from about one to many diameters apart. Propodeal dorsum rugose and with longitudinal ridges (ridges irregular except well defined and regular in Ethiopian specimens); side ridged; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum without well-defined carina on inner margin. Inner apical spine of hindtarsomere V reaching claw base. Sternum I with or without longitudinal carina.

Setae erect on each side of oral fossa next to occipital carina (length 0.3–0.5 × basal mandibular width); markedly curved on scutum (setal tips nearly touching scutal surface) except suberect anteriorly; only slightly obscuring integument of mesopleuron; oriented anterad on propodeal dorsum but adlateral setae oriented posterad and meeting apicomesally; suberect or erect on midfemoral venter, about as long as midocellar diameter.

Head and thorax black, mandible yellowish red (except apically), pronotal lobe yellowish or reddish posteriorly. Frontal setae in female either all silvery or with golden tinge just beneath midocellus; in male silvery except with golden tinge just below midocellus, but all golden in Kenyan and most Tanzanian specimens. Wings almost hyaline; forewing costal vein light brown, subcostal vein

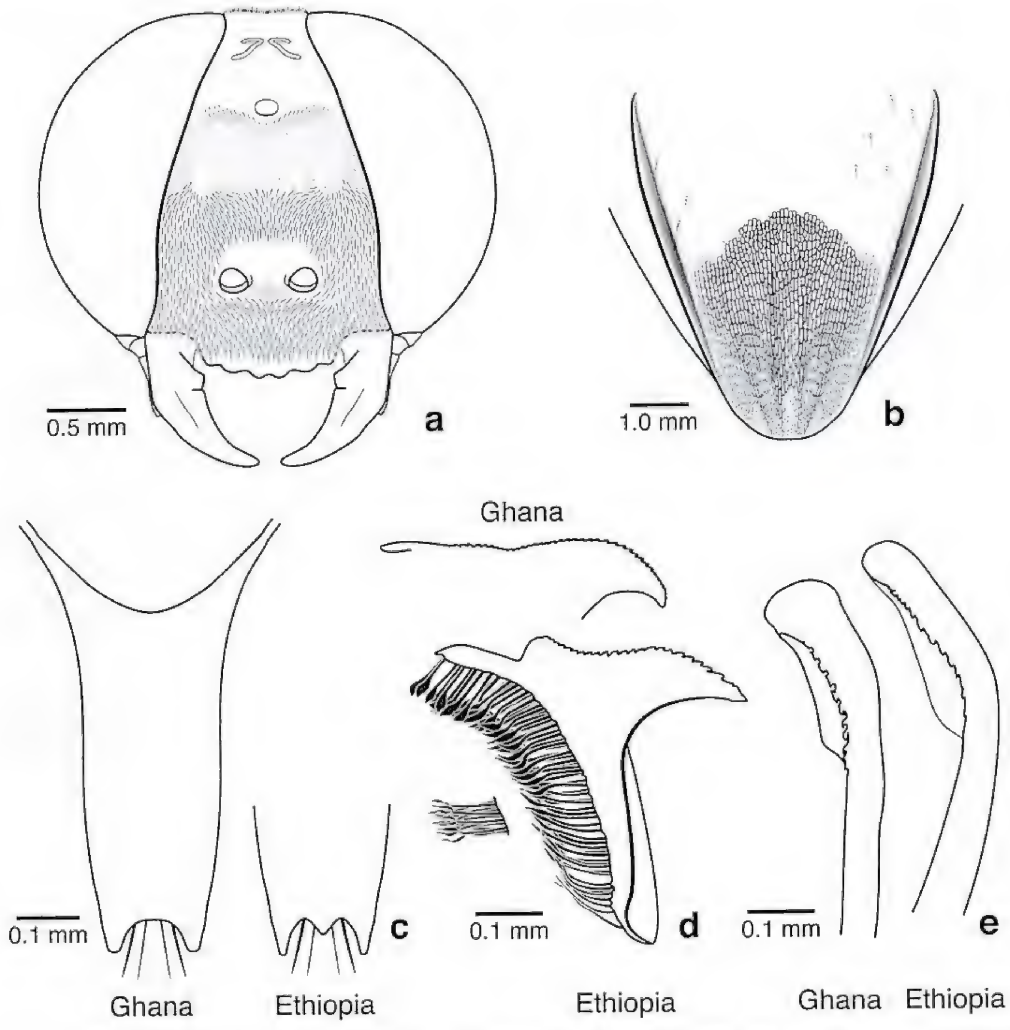

FIGURE 30. *Tachysphex argenticeps* Arnold: a – head of an Ethiopian female in frontal view; b – pygidial plate of female; c – male sternum VIII; d – volsella; e – penis valve.

light brown to brown. Femora all red or fore- and midfemora black (except apically) and hindfemoral dorsum black basally. Tibiae and tarsi red. Gaster red or segments IV and V black in female (also segment VI in some females), segments IV–VII brown or black in many males. Terga I–III or I–IV in female, I–IV or I–V in male, silvery fasciate apically.

♀.— Clypeus (Fig. 29a): bevel rudimentary or absent; lip free margin with six obtuse teeth (admedian or lateral teeth may be fused). Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–2.5 × apical width. Forefemoral venter with sparse, minute, inconspicuous punctures, at least basally. Dorsal foretibial surface with two or three spines, outer surface with two or three spines. Forebasitarsus with 7–9 rake spines. Venters of apical tarsomeres each with one subbasal and one preapical spine. Preapical setae of segments IV and V thickened. Apical depression of tergum V impunctate and asetose, markedly broadened mesally. Pygidial plate unusually

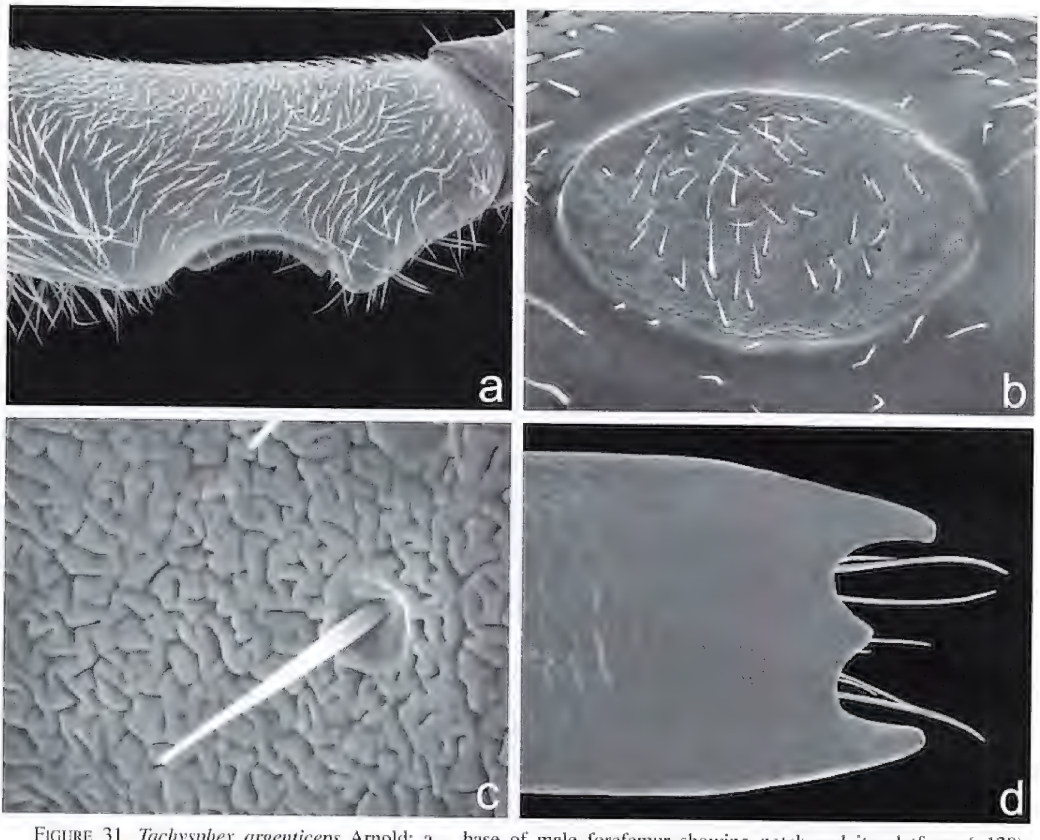

FIGURE 31. *Tachysphex argenticeps* Arnold: a – base of male forefemur showing notch and its platform (×120); b – forefemoral notch in top view (×360); c – sculpture of forefemoral notch (×3000); d – apex of male tergum VIII.

broad, its basal part shiny, unsculptured except for a few, sparse punctures; distal part sharply delimited, dull, microsculptured (Figs. 29c, d, 30b) (also with ill-defined, longitudinal ridges in many Kenyan and Tanzanian females). Length 7.8–9.8 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 29b): bevel rudimentary or absent; lip free margin with conspicuous median projection and well-defined, prominent corner; distance between corners 0.8 × distance between corner and orbit. Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral notch with well-defined, characteristically microsculptured, microscopically setose platform (Figs. 31a-c). Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Venter of tarsomeres V, in many specimens, each with one preapical spine. Tergum VII with punctures that are several diameters apart (except less than one diameter apart near hindmargin). Punctures of sterna III–VI averaging several to many diameters apart, thus integument largely glabrous (sternum IV or sterna III and IV densely punctate anterolaterally). Length 5.2–9.0 mm. Volsella and penis valve: Figs. 30d, e.

VARIATION.— West African specimens differ from East African individuals (i.e., those from Ethiopia, Kenya, and Tanzania) in details of trochanteral punctation, form of sternum I, pilosity, and shape of male sternum VIII and volsella, as described below:

1. Sternum I is ecarinate in most West African specimens, but has a well-defined median carina in those from East Africa and Namibia.
2. In females from West Africa, the frons is uniformly, densely setose between the antennal sockets and midocellus (the integument is concealed), and the interantennal area is setose. In East African females, the dense pilosity conceals the integument on the frons lower half and also on a transverse strip just below the midocellus, but the intermediate zone is covered with finer, sparse setae, and the integument is easily visible (Fig. 30a); the interantennal area is asetose.
3. Punctures of the midtrochanteral venter are several diameters apart in West African females, whereas about one or two diameters apart in those from East Africa.
4. Male sternum VIII is evenly emarginate apically, but markedly tridentate (Figs. 30c, 31d) in Ethiopian and most Kenyan and Tanzanian specimens.
5. The volsella has a dorsal expansion in West African males, but the expansion is lacking in East African and Namibian specimens (Figs. 30c, d).

WALKING BEHAVIOR.— I observed both females and males *of argenticeps*, first in a dry river bed near Olorgesailie, Kenya, in June and July 1999, and subsequently on several other occasions. Specimens were performing short flights, then landing and walking in patterns that varied from straight to circular. This behavior is shared with *vestitus* and in contrast with many other *Tachysphex*, including the closely related *vulneratus*, whose males stay in one place or walk only minimally between flights.

GEOGRAPHIC DISTRIBUTION (Fig. 32).— Ivory Coast to Ethiopia, Somalia, Kenya, and Tanzania, also Namibia.

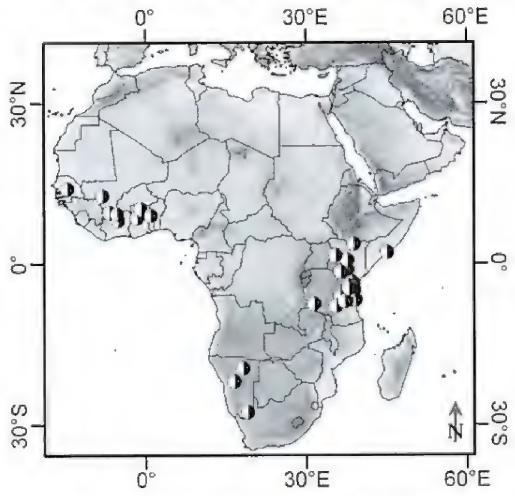

FIGURE 32. Collecting localities of *Tachysphex argenticeps*.

RECORDS.— **ETHIOPIA**: **Sidamo**: 22 km N Moyale (14 ♀, 7 ♂), 35 km N Moyale (2 ♀, 2 ♂). **GHANA**: Buipe (1 ♂), Kawampe 45 km N Kintampo at 8°30′N 1°35′W (2 ♂), 55 km N Tamale (1 ♂). **IVORY COAST**: 20 km W Boundiali (1 ♀), Katiola (1 ♂, MSNT), 56 km N Niakaramandougou (3 ♂). **KENYA**: **Coast Province**: Taita Discovery Centre (1 ♀, 1 ♂), ca 10 km N Taita Discovery Centre (5 ♂), Voi (1 ♀, 1 ♂). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (3 ♀, 3 ♂), 5 km NNE Isiolo (1 ♂), 94 km E Thika (2 ♂). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♂), Magadi road 46 air km SW Nairobi (17 ♀, 12 ♂; 2 ♂, CNC; 4 ♂, MSNT; 4 ♂, NHMZ; 5 ♂ SAM), Marich Pass Field Studies Centre (1 ♀, 5 ♂), Olorgesailie (23 ♀, 30 ♂; 4 ♀, 4 ♂, NMK). **MALI**: Bamako (1 ♂, KMG). **NAMIBIA**: **Grootfontein District**: 10 km NE Grootfontein (1 ♂, OHL). **Karasburg District**: Blinkoog Farm 50 km NE Karasburg (1 ♀, NMN). **Okahandja District**: ca 30 km W Okahandja (2 ♂, OHL). **SENEGAL**: near Koumpentoum (1 ♀, UCD). **SOMALIA**: Afgoi (1 ♂, RMNH). **TANZANIA**: **Coast Region**: 17 km E Chalinze (2 ♀, 3 ♂). **Dar es Salaam Region**: Dar es Salaam: Bahari (1 ♀, MSNT). **Dodoma Region**: 74 km E Dodoma (2 ♂). **Iringa Region**: 18 km W Iringa (1 ♂). **Kilimanjaro Region**: 18 km S Same (1 ♀, 1 ♂), 19 km SE Same (2 ♀, 1 ♂). **Morogoro Region**: 11 km W Morogoro (1 ♀, 1 ♂), 48 km W Morogoro (3 ♀, 2 ♂), 60 road km SW Morogoro (1 ♂), 62 road km SW Morogoro (11 ♀, 15 ♂; 5 ♀, 4 ♂, UDS). **Rukwa Region:** northern Rukwa Valley (5 ♂, BMNH). **Tanga Region**: 73 km NW Korogwe (3 ♀, 4 ♂), 84 km NW Korogwe (14 ♂), 10 km WNW Mabokweni (1 ♂), 2 km NE Mkomazi (1 ♂), Pangani River Camp 86 km NW Korogwe (3 ♂). **Region unknown**: Itumba in Rukwa Valley (1 ♂, BMNH, holotype of *argenticeps*). **TOGO**: 5 km W Sokodé (16 ♀, 1 ♂).

***Tachysphex argentifrons* Arnold**
Figures 33–36.

Tachysphex argentifrons Arnold, 1924:58, ♀, ♂ (♀ = *Tachysphex melanius*). Lectotype: ♂, South Africa: Eastern Cape Province: Algoa Bay (TMP), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).
As *Tachysphex hippolyta*: de Beaumont, 1967b:509 (South Africa), **present correction**.

Recognition.— The female of *argentifrons* has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate, almost straight (Fig. 33f), apicoventral margins of tarsomeres III and IV mesally projecting or at least convex, tarsomeres V angulate basoventrally, each with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe (Figs. 34a, b), and on each leg one claw smaller than the other (Fig. 34c). Other species share these characteristics, but *argentifrons* differs in having a combination of unusually short flagellomere I (dorsal length 1.4–1.6 × apical width and about 0.6 × length of II, Fig. 33c), sparsely setose fore- and midfemoral posteroventral surfaces, with setigerous punctures many diameters apart (Fig. 33e), and the dorsal outer margin of foretarsomere IV markedly shorter than the inner margin. Subsidiary recognition features include: gaster and tibiae all black; free margin of the clypeal lip with two lateral incisions on each side (Fig. 33a), at least three apical rake spines of forebasitarsus with sockets contiguous, and apical depression of sternum I not bisected by longitudinal carina. The female of *venator* is similar, but has flagellomere I longer (dorsal length about 2.25 × apical width, about 0.85 length of II), the free margin of the clypeal lip with only one, shallow lateral emargination (Fig. 406), an impunctate midtrochanteral venter, and apical depression of sternum I bisected by longitudinal carina.

The male of *argentifrons* is instantly recognized by its unusually short flagellomere I and contrastingly long flagellomere II: the ventral length of I is smaller than apical width or exceptionally equal to apical width, slightly less than half length of II (Fig. 33d) In addition, the clypeal lip is pointed mesally (Fig. 33b), with the free margin somewhat concave between the midpoint and corner.

Description.— Scutal punctures well defined, averaging about two diameters apart on disk in female, about one diameter in male. Mesopleural punctures, in most specimens, well defined, averaging from about 1–2 to 2–3 diameters apart near center, but minute, evanescent, several diameters apart in one female from Nylsvley Nature Reserve, South Africa; interspaces with microsculpture that varies from conspicuous to evanescent (integument dull to shiny). Propodeal dorsum finely, irregularly rugose to evenly microareolate, in most specimens with short, irregular ridges diverging from anterior margin; side ridged. Hindcoxal dorsum with inner margin carinate.

Setae straight; subappressed to suberect on each side of oral fossa next to occipital carina; erect on postocellar area (length about 1.5 × midocellar diameter) and on scutum (length about one midocellar diameter); slightly inclined posterad on propodeal dorsum; on midfemoral venter subappressed to suberect in female, erect in male (length about one midocellar diameter).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female and most males, with golden tinge in some males from Bergfliet Forest Reserve, South Africa. Wing membrane slightly infumate; forewing costal vein light brown, subcostal vein dark brown. Gaster, femora, and tibiae black, inner foretibial surface reddish in some males; tarsi varying from all black to largely red. Terga I–III silvery fasciate apically.

♀.— Labrum shallowly emarginate. Clypeus (Fig. 33a): bevel shorter to longer than basomedian area, the two areas not clearly delimited in some specimens; lip free margin arcuate, shallow-

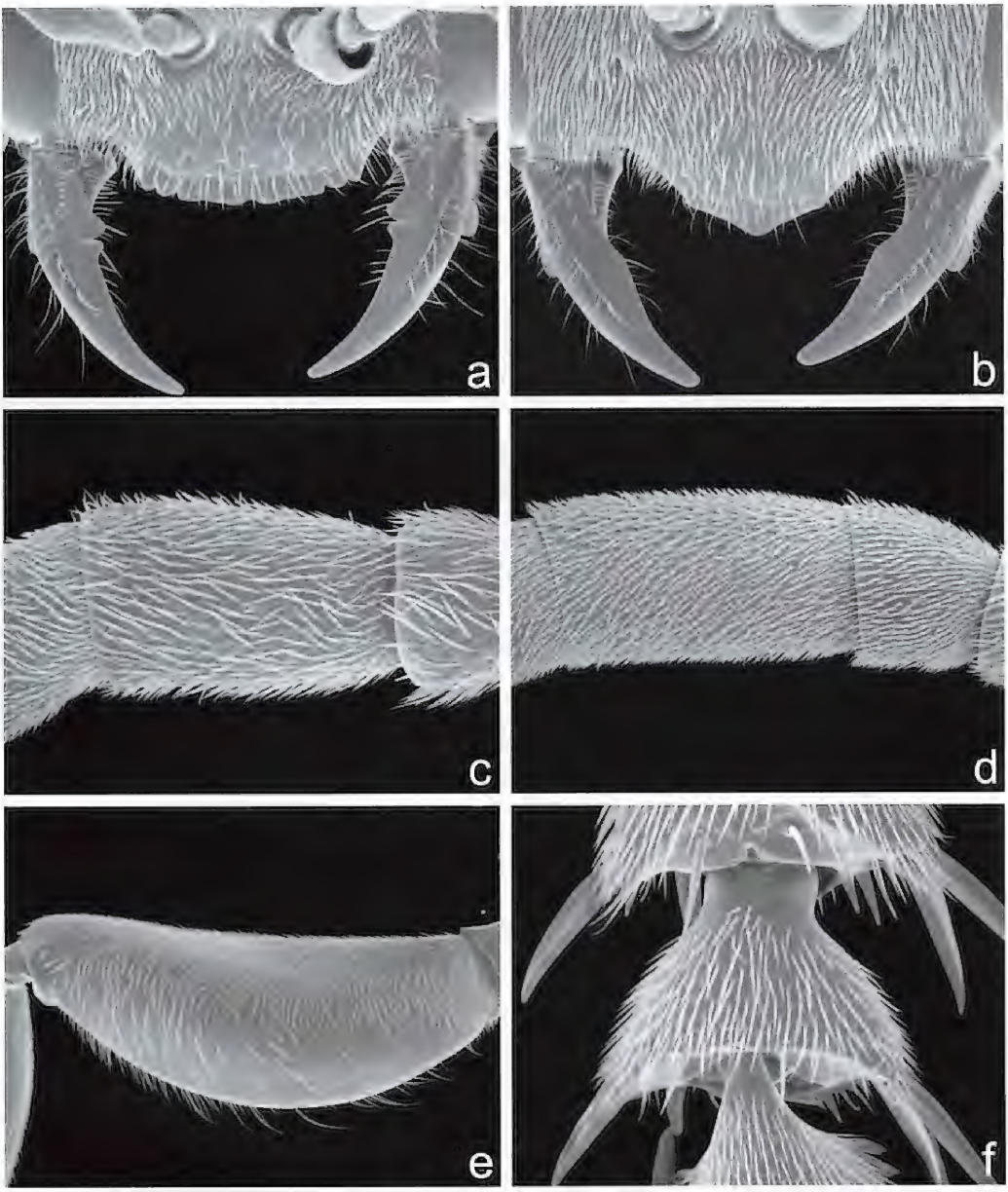

FIGURE 33.*Tachysphex argentifrons* Arnold: a – female clypeus and mandible (×44); b – male clypeus and mandible (×57); c – female flagellomere I (×180); d – male flagellomeres I and II (×130); e – female forefemur, posterior surface (×50); f – female hindtarsomere IV, dorsal view (×120).

ly emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 1.4–1.6 × apical width (Fig. 33c). Scutum and scutellum flattened. Fore- and midfemoral venters and posteroventral surfaces aciculate, with well-defined punctures that are many diameters apart (Fig. 33e). Dorsal foretibial surface with several bristles, outer

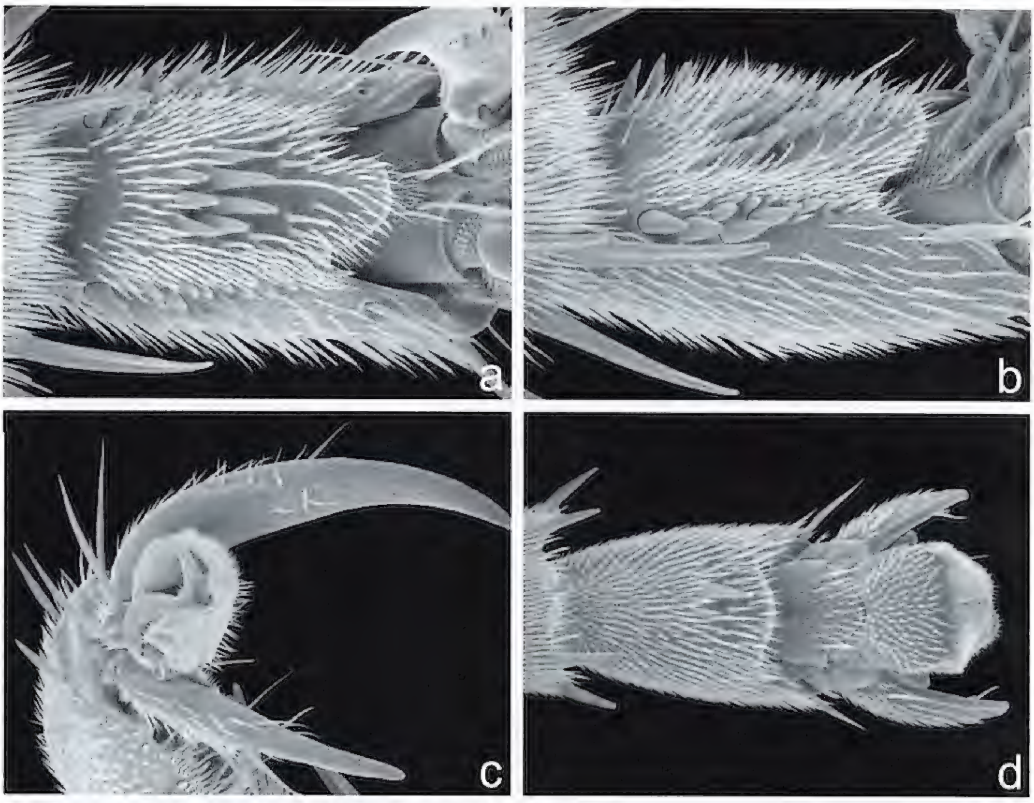

FIGURE 34. *Tachysphex argentifrons* Arnold: a – female hindtarsomere V, ventral view (×240); b – female hindtarsomere V, oblique lateral view (×240); c – female hindtarsal claws (×150); d – male hindtarsomere V, ventral view (×144).

surface impunctate, asetose except for a few thin bristles. Forebasitarsus with 8–11 rake spines. Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical margin very broadly emarginate, almost straight (Fig. 33f) and apicoventral margin obtusely prominent; outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter (Fig. 34a); lateral margin with row of small spines subbasally (Fig. 34b); apicoventral margin produced into lobe (Fig. 34a). Outer claws of mid- and hindtarsi shorter, thinner than inner claws (Fig. 34c), but opposite on foretarsus. Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that average many diameters apart; interspaces shiny, aciculate or unsculptured. Length 7.8–8.5 mm.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 33b): bevel ill defined but shorter than basomedian area; lip free margin pointed mesally, slightly concave between midpoint and nonprominent corner; distance between corners 0.9–1.1 × distance between corner and orbit. Width of postocellar area 1.0–1.3 × length. Dorsal length of flagellomere I 0.9–1.1 × apical width, equal to about 0.6 of II, ventral length mostly less than apical width (Fig. 33d), but equal to apical width in single specimen from 30 km W Grahamstown. Length of flagellomere II 1.6 × width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of apical tarsomeres, in some specimens, each with apicomedian cluster of minute spines; apiconventral margin slightly arcuate (Fig. 34d). Sternum VIII: apical margin with median tooth that ranges from prominent to

minute (rounded in some specimens). Length 5.7–7.7 mm. Volsella and penis valve: Fig. 35.

GEOGRAPHIC DISTRIBUTION (Fig. 36).— South Africa.

RECORDS.— **SOUTH AFRICA: Eastern Cape Province**: 10 km SE Alexandria (5 ♂, OÖLM), Alexandria Forest (1 ♀, 2 ♂, AMG), Algoa Bay (1 ♂, TMP, lectotype of *argentifrons*), Colchester at 33°42′S 25°50′E (1 ♀, 3 ♂), 30 km W Grahamstown (1 ♂), 18 km WNW Grahamstown: Hilton Farm (2 ♂, AMG; 2 ♂, PMA), Jeffreys Bay (1 ♂, SAM), Kenton-on-Sea (3 ♂, AMG), Nature's Valley at 33°55′S 23°32′E (2 ♂, PPRI), Plettenberg Bay (1 ♂, AMG), 6 km N Steytlerville (1 ♀, 4 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (2 ♂, USU), Willowmore (1 ♂, SAM, paratype of *argentifrons*; 2 ♂, TMP), 37 km NW Willowmore in Grootrivierberg Range (1 ♀, 6 ♂, USU), 6 km S Willowmore at 33°20′S 23°27′E (3 ♂). **Gauteng**: Bryanston (1 ♂, AMG), Johannesburg: Cyrildene Island (1 ♂, AMG) and Melville Koppies Reserve (2 ♀, 2 ♂, FSCA), Magaliesburg (2 ♀, AMG), Pretoria (3 ♀, 2 ♂, AEI), Pretoria: Botanical Garden (2 ♀, 1 ♂; 1 ♀, MS), Pretoria: 37 Farmers Folly Lynnwood (1 ♂, FSCA), Pretoria: Gardens of Union Building at 25°45′S 28°12′E (2 ♂, PPRI), Roodeplaat (1 ♂, PPRI), Strubens Valley: Florida at 26°08′S 27°54′E (2 ♂, AMG). **Kwazulu-Natal**: Cathedral Peak (1 ♂, USU), Hluhluwe Game Reserve (1 ♂, AEI), Mdedelelo Wilderness Area at 29°07′S 29°26′E (1 ♂, PPRI), Utrecht (2 ♀, OÖLM), 10 km w Utrecht (3 ♀, 1 ♂, OÖLM). **Mpumalanga**: Barberton (1 ♀, 1 ♂, PPRI), Bergvliet Forest Reserve: Sabie at 25°05′S 30°54′E (1 ♀, 2 ♂; 2 ♀, 4 ♂, PPRI), Bourkes Luck at 24°40′S 30°48′E (1 ♀), Graskop (1 ♂, PMA), Loskop Dam Nature Reserve (3 ♂, PPRI), 20 km SW Lydenburg (1 ♂, OÖLM), Mariepskop at 24°35′S 30°52′E (1 ♂, PPRI), 11 km E Pilgrim's Rest (1 ♀, 1 ♂, PMA). **Northern Cape Province**: Horingsgat at 30°18′S 18°05′E (1 ♀, PMA). **Northern Province**: Buffelspoort Dam (1 ♀, 1 ♂, AMG), Dunstable Farm at 24°27′S 30°45′E (1 ♂), Entabeni Forest Reserve: Soutpansberg at 23°00′S 30°16′E (1 ♂, PPRI), Guernsey Farm 15 km E Klaserie (1 ♀, PMA), Happy Rest Nature Reserve at 22°59′S 29°46′E (1 ♀, 2 ♂, PPRI), Mogoto Nature Reserve near Zebediela (2 ♂, PPRI), 10 km SW Naboomspruit (2 ♀, 2 ♂, FSCA), Nylsvley Nature Reserve (1 ♀, PPRI), Potgietersrus (2 ♂, PMA), Wylliespoort at 22°58′S 29°57′E (1 ♂; 5 ♂, PPRI). **North-West Province**: Vryburg (1 ♂, AMG). **Western Cape Province**: Bo Kouga (2 ♀, 2 ♂, SAM), Cape of Good Hope Nature Reserve (4 ♂, USNM), Cape Peninsula: Hout Bay (4 ♀, 6 ♂, ZMLU, determined as *Tachysphex hippolyta* by de Beaumont), Cape Town: Table Mountain at 33°57′S 18°24′E (1 ♀, 1 ♂), Cape Town: above Tokai Forest in Constantiaberge at 34°02′S 18°23′E (14 ♀, 25 ♂, SAM), Ceres (1 ♀, BMNH), 40 km E Clanwilliam: Sevilla (1 ♀, 4 ♂, USU), 19 km ENE Clanwilliam at 32°05′54″S 19°03′56″E (1 ♂; 3 ♂, CSE), Hermanus: Fernkloof Nature Reserve (2 ♀, 1 ♂, SAM), Kirstenbosch near Cape Town (2 ♀, 5 ♂, AEI), 5 km S Lambert's Bay (4 ♂, OÖLM), Mossel Bay (1 ♂, BMNH), Pearly Beach (1 ♂, SAM), Stellenbosch: Jonkershoek (1 ♀; 1 ♂, AEI; 4 ♀, 8 ♂, PMA).

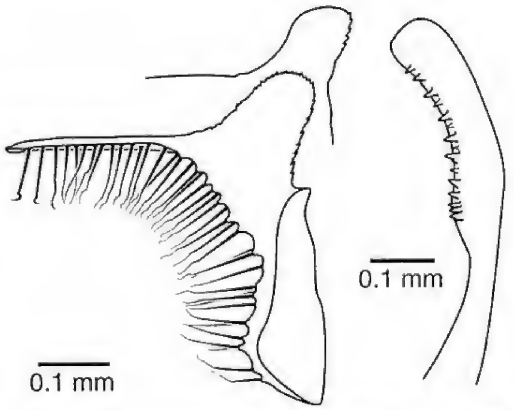

FIGURE 35.*Tachysphex argentifrons* Arnold: volsella and penis valve.

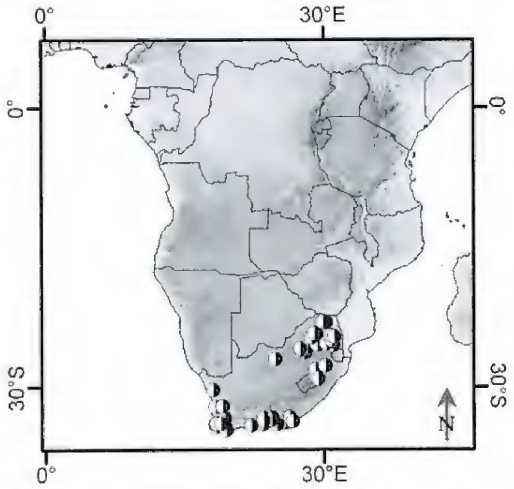

FIGURE 36. Collecting localities of *Tachysphex argentifrons*.

Tachysphex asinus Arnold

Figures 37–41.

Tachysphex asinus Arnold, 1923:166, ♀. Holotype: ♀, Zimbabwe: Sawmills (SAM), examined.— Arnold, 1924:66 (description of ♂), 1930:3 (in checklist of Afrotropical Sphecidae); nec Arnold, 1935:497 (= *scaber*); Bohart and Menke, 1976:272 (listed).

FIGURE 37. *Tachysphex asinus* Arnold: female in lateral view.

RECOGNITION.— *Tachysphex asinus* resembles *onager* and *scaber* in having the supraantennal swelling punctate and setose (rather than impunctate, glabrous), legs largely red, and gaster all or partly red. In the female, flagellomeres III–X are flattened laterally, each with a characteristic sensory area (Figs. 38c-e), the pygidial plate is punctatorugose (Figs. 39a, b), and the length of midtarsomere II is less than twice its width.

Tachysphex asinus itself can be recognized by its finely, uniformly punctate scutum (punctures about as large as those on the postocellar area, no more than one diameter apart). In *onager*, many scutal punctures are markedly more than one diameter apart, and in *scaber* the punctures are coarse, larger than those on the postocellar area. In the male of *asinus*, in addition, the clypeal bevel is absent or markedly shorter than the basomedian area (about as long as basomedian area in *onager* and some *scaber*), the mesopleural integument is dull between the punctures (shiny in *onager*), and the setae are suberect (except in smallest specimens) on the apical depressions of sterna III–VI (setae appressed in *scaber*). Subsidiary recognition features of *asinus* are: cephalic setae all golden in both sexes (also thoracic setae in most specimens) and wings markedly bicolored (yellow basally, brown with violet shimmer in the apical third) except in smallest specimens.

SIMILAR UNASSIGNED SPECIMEN.— A male from Kilwa near Kasenga, Shaba Province, Zaire (MRAC), closely resembles *asinus* in the frontal, scutal, and mesopleural sculpture, but differs in having a somewhat longer clypeal bevel, appressed sternal setae, and uniformly dark brown wings. Its status is uncertain at this time.

DESCRIPTION.— Labrum convex apically, somewhat protruding beyond clypeal margin. Galea sparsely punctate, shiny, as long as 0.8 of scape (Fig. 38b). Supraantennal swelling ill defined, punctate and setose like remaining frons. Scutum closely, uniformly punctate, punctures fine. Mesopleural punctures in female several to many diameters apart (interspaces shiny or nearly so), in male nearly contiguous to about one diameter apart beneath scrobe (interspaces dull). Episternal sulcus complete. Propodeal dorsum varying from rugose to almost uniformly microsculptured; side mostly ridged, unridged in smallest individuals. Hindwing vein cu-a varying: anal end as far away from wing base as cubital end or markedly further. Hindcoxal dorsum with inner margin carinate basally, carina somewhat expanded.

Setae erect on each side of oral fossa next to occipital carina, appressed on postocellar area and scutum, oriented obliquely posterad on propodeal dorsum (except oriented anterad near base).

Head and thorax black, but the following are reddish: mandible mesally, scapal venter, pronotal lobe (all or partly), and up to three basal flagellomeres in some females. Wing membrane yel-

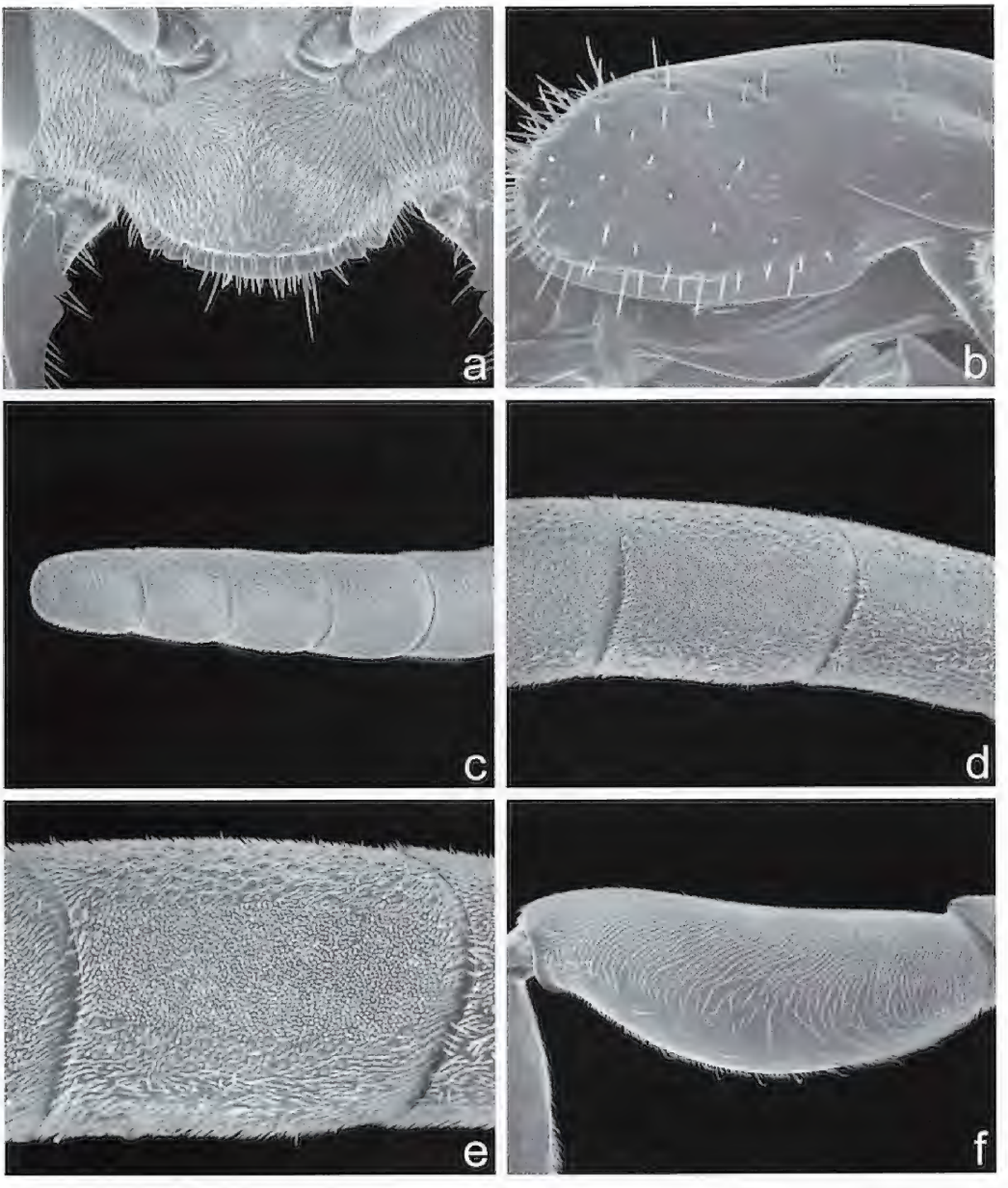

FIGURE 38. *Tachysphex asinus* Arnold: a – female clypeus (×27); b – male galea (×96); c – apical flagellomeres of female (×46); d – portion of female antenna with flagellomere IV in center (×72); e – female flagellomere IV (×140); f – female forefemur, posterior view (×32).

low basally, in most specimens contrastingly darkened (with violet shimmer) in apical third (Figs. 37, 40a), but all yellow in smallest individuals; both costal and subcostal veins of forewing reddish. Legs red except coxae black, also femoral bases black in some females. Gaster red (except base of segment I black) or predominantly black (more often so in females than in males). Cephalic setae

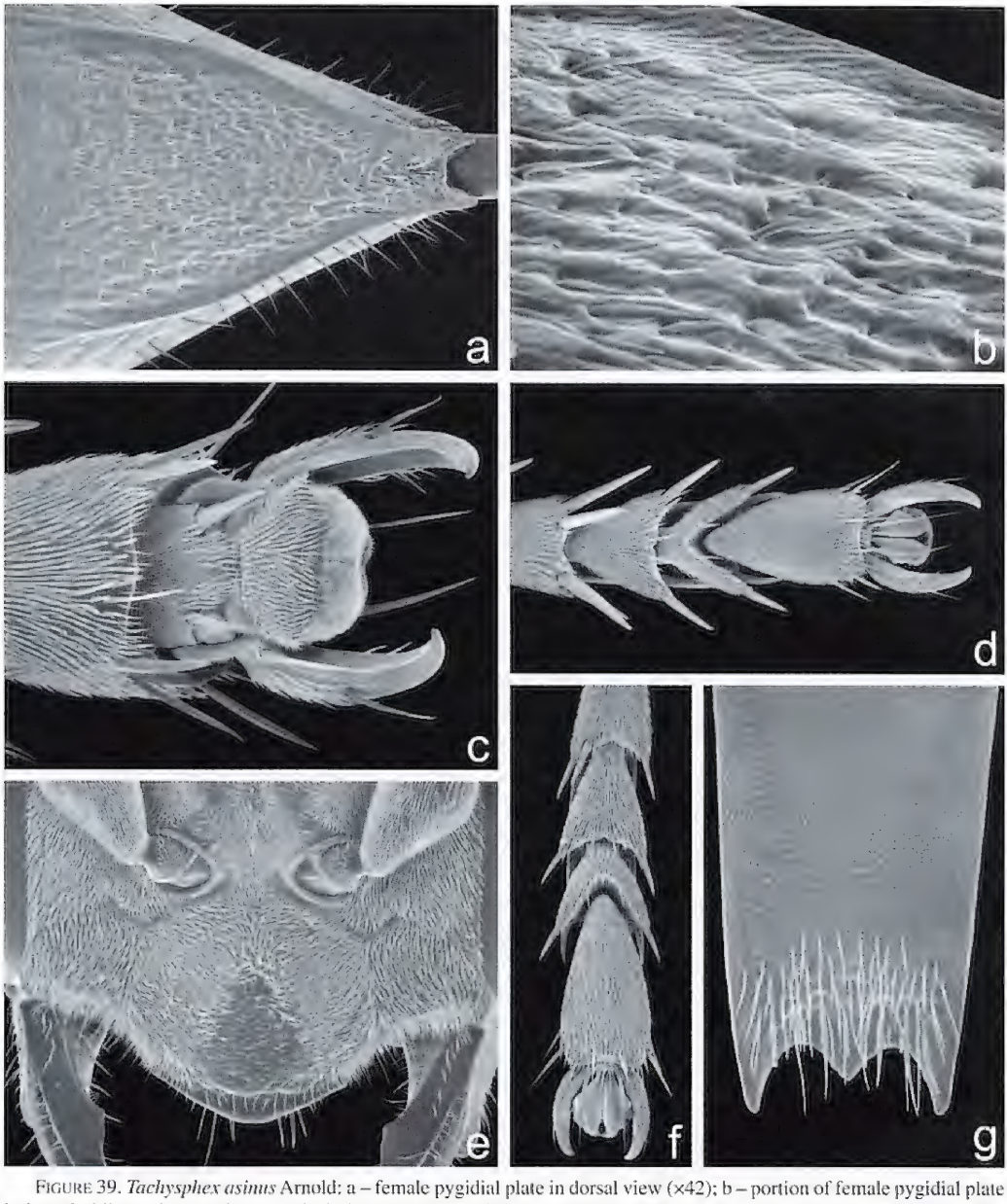

FIGURE 39. *Tachysphex asinus* Arnold: a – female pygidial plate in dorsal view (×42); b – portion of female pygidial plate in lateral oblique view (×42); c – apical hindtarsomere of female, ventrally (×90); d – female midtarsomeres III–V (×36); e – male clypeus (×33); f – male midtarsomeres III–V (×42); g – male sternum VIII (×90).

golden in both sexes, also thoracic setae in most specimens. Tergal fasciae ill defined.

♀.— Clypeus (Fig. 38a): middle section markedly convex, bevel markedly shorter than basomedian area, not sharply delimited from the latter (large punctures intermixed with micropunctures); lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 1.6 × apical width, flagellomeres VII–IX about as

wide as long; flagellomeres III–X compressed laterally, ventral surface with characteristic sensory areas (Figs. 38c-e). Forefemoral venter shiny, with minute setigerous punctures that are at least several diameters apart (Fig. 38f); only a few punctures present in some individuals. Dorsal foretibial surface with several fine bristles, outer side with impunctate, glabrous zone (which is ill defined in some specimens) and a few erect setae rather than spines. Tarsi short: length of fore- and midtarsomeres II about 1.2 × and 1.6 × apical width, respectively (1.2 and 2.0 in single female from Delagoa Bay, Mozambique, the smallest of all examined); that of midtarsomere III equal to apical width (Fig. 39d); of fore-, mid-, and hindtarsomeres IV about 0.8, 0.9, and 1.0 × apical width, respectively. Forebasitarsus with 10–13 rake spines. Apical tarsomeres mostly with two minute spines near apicoventral margin, which is minimally convex (Fig. 39c), but spines absent on one or several legs in some specimens. Apical depression of tergum V impunctate, asetose. Pygidial plate punctatorugose, incised apically (Figs. 39a, b), but incision reduced in worn specimens. Length 10.4–16.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 39e): bevel absent or ill defined, markedly shorter than basomedian area; lip free margin markedly arcuate to obtusely pointed, with ill-defined corner; distance between corners 1.0–1.2 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.3–1.6 × apical width, equal to 0.8–0.85 that of II. Forefemoral notch microscopically setose, margined posteriorly. Outer margin of forebasitarsus without preapical spines (exceptionally with one preapical rake spine next to apical one); outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomeres II and III 1.8–1.9 and 1.2 × apical width, respectively (Fig. 39f). Apical tarsomeres, in some specimens, with one or several small spines apicoventrally. Apical depressions of sterna III–VI with suberect setae that are about one midocellar diameter long and markedly longer than discal setae of sternum II (but setae appressed in smallest specimens). Sternum VIII tridentate apically (Fig. 39g). Length 9.5–14.8 mm. Volsella and penis valve: Figs. 40b, c.

Prey.— Maureen H. Bourbin collected a female of *asinus* with prey 17 km E Chalinze, Tanzania, on 14 June 2001. The wasp was walking on sandy ground with the prey kept dorsum up under her body, holding it by the antennae with her mandibles. Interestingly, she did not release her grip on the antennae even after dying in the killing jar. The prey is an early stage gryllid, 9.5 mm long.

Mimicry.— *Tachysphex asinus* is a member of a mimicry complex that includes *Cerceris diodonta* Schletterer, *Liris haemorrhoidalis* (Fabricius), *Tachysphex mzingeli*, *onager*, and *rhodesianus*, several undetermined *Tachytes*, and an asilid fly (*Ancylorhynchus* sp., det. Eric M. Fisher). Although most of them are instantly recognizable in the laboratory, these species are easily mistaken in the field because of their similar size and coloration (included bicolored wings), as I found

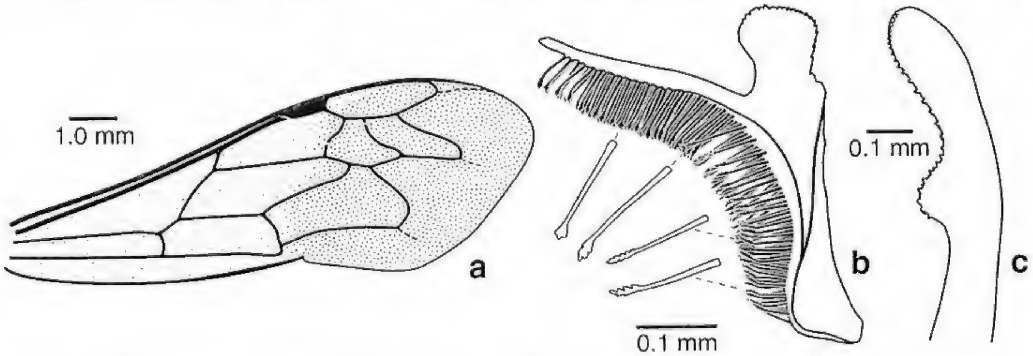

FIGURE 40. *Tachysphex asinus* Arnold: a – forewing showing variously colored areas; b – volsella; c – penis valve.

during my fieldwork in Tanzania, Zambia, and Zimbabwe. The asilid *Hoplistomerus serripes* Fabricius, which closely resembles *Liris haemorrhoidalis* according to Carpenter (1929), is apparently another member of this complex.

GEOGRAPHIC DISTRIBUTION (Fig. 41).— Tanzania to northern Namibia and northern South Africa.

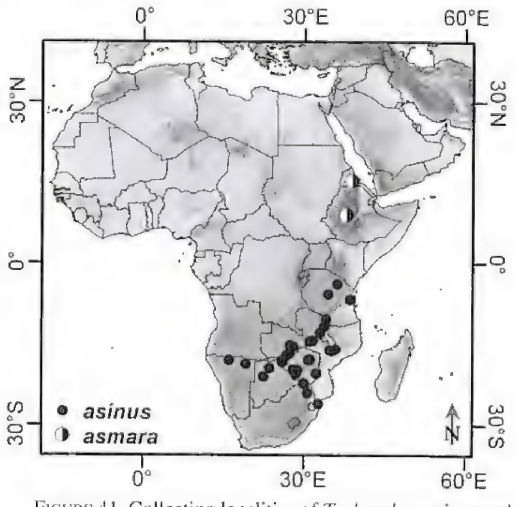

FIGURE 41. Collecting localities of *Tachysphex asinus* and *asmara*.

RECORDS.— **BOTSWANA**: Kuke Pan (1 ♀, BMNH), Moremi Reserve (2 ♀, 8 ♂, BMNH). The female from Gemsbok Pan (Arnold, 1935) is actually *scaber*. **MALAWI**: Chikawa in lower Shire valley (1 ♂, BMNH), between Florence Bay and Karonga (2 ♀, 8 ♂, BMNH), Likangala near Lake Chilwa (1 ♀, ZMAN), Mlanje (1 ♀, BMNH), Mombera District (1 ♂, BMNH). **MOZAMBIQUE**: Delagoa Bay (1 ♀, MCZ). **NAMIBIA**: **Ondangwa District**: Ondangwa (1 ♀, NMN). **Rundu District**: 100 km SW Rundu (2 ♂; 1 ♀, MS). **SOUTH AFRICA**: **Northern Province**: near Beitbridge (2 ♂, PPRI), 17 mi SE Gravelotte (1 ♂), 2 mi N Messina (6 ♂). **TANZANIA**: **Arusha**: Tarangiri National Park at 3°50′S 36°10′E (1 ♂, AMNH). **Coast Region**: 17 km E Chalinze (3 ♀, 18 ♂; 4 ♂, UDS; 4 ♂, JS). **Singida Region**: Itigi (1 ♀, BMNH). **ZAMBIA**: **Eastern Province**: between Chipata and Lundazi (1 ♀, 3 ♂, BMNH), 27 km E Petauke (2 ♂), 31 km E Petauke (3 ♂; 2 ♂, MSNT), 32 km E Petauke (2 ♀, 23 ♂; 12 ♂, MSNT), 42 km WSW Petauke (2 ♂; 1 ♂, MSNT). **Lusaka Province**: 62 km WNW Lusaka (1 ♂, MSNT), Westwood (1 ♀, ZMAN). **Southern Province**: 5 km E Choma (6 ♂; 1 ♂, MSNT), 56 road km NE Choma (1 ♂), 22 km E Kalomo (1 ♂). **ZIMBABWE**: Beitbridge (1 ♀, 1 ♂, BMNH), Bulawayo (1 ♀, 1 ♂, BMNH; 1 ♀, 4 ♂, SAM; 1 ♀, TMP; 1 ♂, ZMAN), Bulawayo airport (1 ♀, 1 ♂), Harare (1 ♀, 1 ♀, BMNH), Kami (1 ♂, AMG; 2 ♀, SAM), Lion and Cheetah Park 24 km W Harare (2 ♀, 11 ♂; 3 ♂, NHMZ), Matetsi (1 ♀, 1 ♂, SAM), Matobo (1 ♀, SAM), Redbank at Kami River (8 ♂), Sabi Valley (1 ♀, 2 ♂, SAM), Sawmills (1 ♀, 1 ♂, SAM, including holotype of *asinus*), Turk Mine (3 ♂, AMG; 7 ♂, SAM; 1 ♂, ZMAN), Victoria Falls (6 ♂; 1 ♂, NHMZ).

Tachysphex asmara Pulawski, sp. nov.

Figures 41, 42.

DERIVATION OF NAME.— *Asmara*, the capital of Eritrea where the holotype was collected and whose name means *united* in the Tigrinya language; a noun in apposition to the generic name.

RECOGNITION.— The female of *asmara* is unique in having a clypeal bevel perpendicular to the basomedian area and delimited from the latter by a crest that extends laterad to the lip corner (Figs. 42a, b). The shape of the clypeal lip is also distinctive. Subsidiary recognition features include: scutum and mesopleuron shiny, conspicuously punctate, midtrochanteral venter impunctate and shiny, setae erect on postocellar area and midfemoral venter, and gaster all red (except for black spots).

The male is characterized by a conspicuously punctate scutum and mesopleuron (with most interspaces shiny), setae erect on the postocellar area and midfemoral venter, and an all red gaster. Other characters that help in recognition are: clypeal lobe narrow (distance between corners 0.7, × distance between corner and orbit), midtrochanteral venter impunctate and shiny, forebasitarsus with two rake spines in basal half, and outer apical spine of foretarsomere II markedly shorter than foretarsomere III.

DESCRIPTION.— Scutal and mesopleural punctures conspicuous, averaging more than one

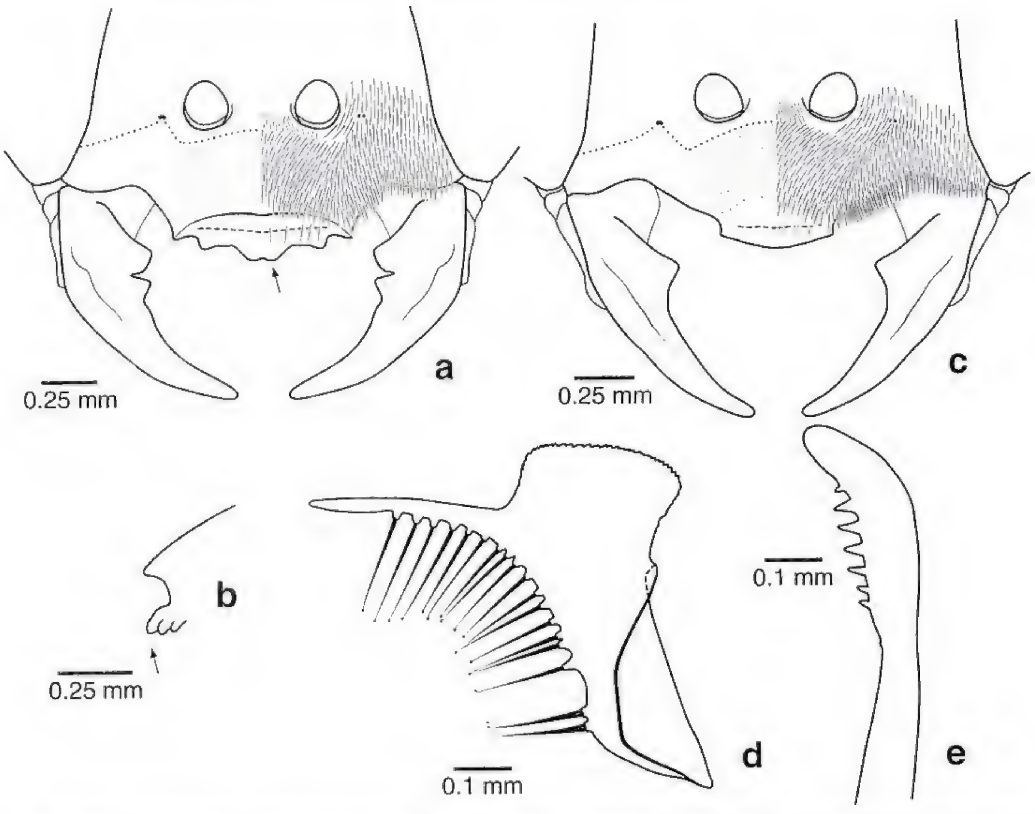

FIGURE 42. *Tachysphex asmara* Pulawski, sp. nov.: a – female clypeus and mandible; b – outline of female clypeus in lateral view showing vertical bevel; c – male clypeus and mandible; d – volsella; e – penis valve.

diameter apart at center of each of these two sclerites; interspaces unsculpured or nearly so. Propodeal dorsum rugose, side ridged. Hindcoxal dorsum with inner margin carinate basally. Midtrochanteral venter impunctate, shiny.

Setae suberect on each side of oral fossa next to occipital carina, sinuous in female, straight in male (setal length 0.4 × basal mandibular width in female, 0.3 × in male), erect on postocellar area (length about 1.5 × midocellar diameter in female, about 1.0 × in male), inclined posterad on scutum anteriorly; inclined obliquely anterad on propodeal dorsum; suberect on midfemoral venter.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal vein of forewing reddish brown, subcostal vein brown. Femora black except male hindfemur red dorsoapically; fore- and midtibiae black, hindtibia reddish dorsally in female, largely red in male; tarsi reddish. Gaster red (female segments II and III as well as sternum IV with black spots). Terga I–III fasciate apically (fasciae golden, visible only from certain angles in female, silvery in male).

♀.— Clypeus (Figs. 42a, b): bevel perpendicular to basomedian area, i.e., parallel to insect's longitudinal axis, delimited from basomedian area by crest that extends laterally to lip corner; lip free margin with conspicuous median projection (that is slightly emarginate mesally), deeply incised laterally. Width of postocellar area 1.4 × length. Dorsal length of flagellomere I 2.6 × apical width. Forecoxa with minuscule apicomedian process. Dorsal foretibial surface with two spines,

outer surface with one spine near midlength. Forebasitarsus with nine rake spines. Apical depression of tergum V unsculptured, asetose. Pygidial plate with punctures that average several diameters apart except close to each other near margin; interspaces shiny, almost unsculptured. Length 14.1 mm.

♂.— Mandible: trimmal carina with prominent tooth, without cleft. Clypeus (Fig. 42c): bevel flat, markedly shorter than basomedian area, forming obtuse angle with the latter; lip free margin arcuate, with well-defined corner; distance between corners 0.7. × distance between corner and orbit. Width of postocellar area 1.5 × length. Dorsal length of flagellomere I 1.8 × apical width. Forefemoral notch with bottom microscopically setose. Outer margin of forebasitarsus with two rake spines in basal half in addition to apical one; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Sterna densely punctate except apical depressions of sterna III–VI practically unsculptured and glabrous. Length 8.1 mm. Volsella and penis valve: Figs. 42d, e.

Geographic distribution (Fig. 41).— Eritrea, Ethiopia.

Records.— Holotype: ♀, **ERITREA**: Asmara, 31 Jan 1929, collector unknown (CAS). Paratype: **ETHIOPIA**: **Shewa**: Ambo, 7,500′ [= 2,500 m], 3–6 Feb 1962, S.M. Clark (1 ♂).

Tachysphex aterrimus Arnold

Figures 43, 44.

Tachysphex aterrimus Arnold, 1924:56, ♀, ♂. Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Lectotype selection.— Arnold (1924) studied 21 specimens of *aterrimus*, one of which is actually *titania*. He mentioned a female and a male as the types, and he designated only one additional pair as paratypes. I select as a lectotype of *aterrimus* the female that he labeled as the type, and the male as a paralectotype.

Recognition.— *Tachysphex aterrimus*, an all black southern African species, has a flat labrum, midtarsomere II more than twice as long as apically wide, apical tarsomeres without spines on venter or lateral margins, and the anal end of hindwing crossvein cu-a as far from the wing base as the cubital end or slightly closer. Furthermore, the setae are erect on the postocellar area (Figs. 43a, b) and midfemoral venter and diverging obliquely anterad from the propodeal midline.

A number of species share these characteristics, but *aterrimus* differs by the sculpture of its frons, clypeus, and mesopleuron, by the width of the postocellar area, and the shape of the clypeus. In particular, the mesopleural punctures are well defined, at least 2–3 diameters apart, and the interspaces are shiny; the area between the supraantennal swelling and midocellus is either dull, unevenly microsculptured and with shallow, ill-defined punctures, or it is sparsely punctate, with unsculptured interspaces. The clypeal bevel is unsharply delimited from the basomedian area, and the sparse punctation extends to the frontoclypeal suture or nearly so. The width of postocellar area is 1.8–2.0 × length in the female and 2.4–2.8 × length in the male. In the female, the middle clypeal section (Fig. 43c) is almost flat, as in *fugax* and *helveticus aegyptiacus*, but unlike those taxa the clypeal setae do not conceal the integument, and unlike *fugax* the flagellum is not elongate, the length of flagellomere IV being 2.5–2.6 × apical width (rather than 4.0–4.5). In addition, the clypeal lip of many females has a lateral incision or sinuosity (Fig. 43c). In the male, the clypeus has a well-defined corner (Fig. 43b), the corners being about as far from each other as from the respective orbit; and subsidiary recognition features are: foretarsal rake present, apical portion of volsella without setae (Fig. 43e).

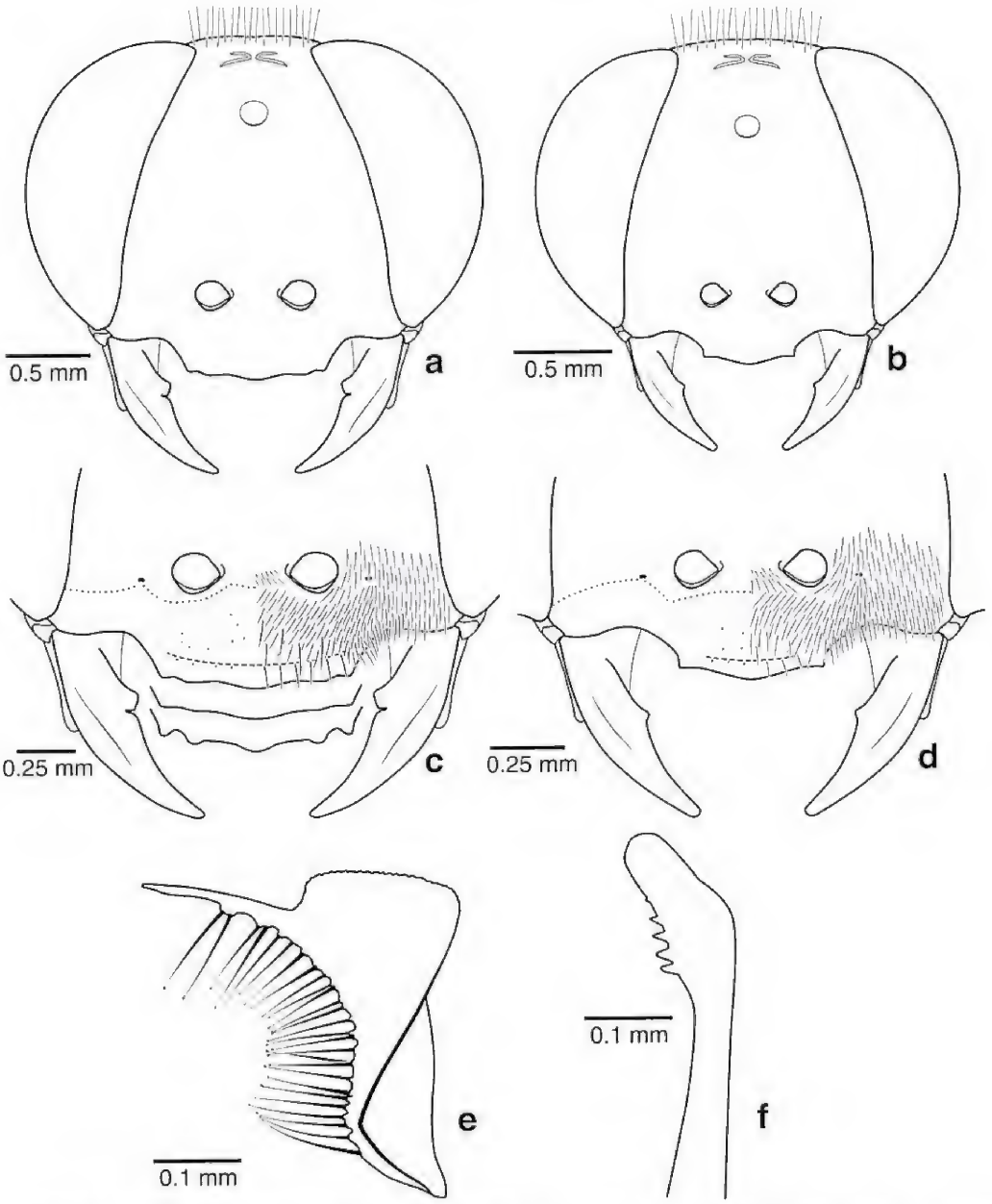

FIGURE 43. *Tachysphex aterrimus* Arnold: a – female head in frontal view; b: male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

DESCRIPTION.— Mandible: outer ridge somewhat swollen and expanded over notch. Labrum shallowly emarginate mesally. Clypeal bevel indistinctly delimited from basomedian area, sparse punctation of clypeal middle section extending to frontoclypeal suture or nearly so. Scutal punctures well defined, several diameters apart on disk (at least 2–3 diameters). Mesopleural punctures

well defined, at least 2–3 diameters apart (interspaces unsculptured). Punctures of mesothoracic venter varying from about one to several diameters apart. Episternal sulcus complete in some specimens. Propodeal dorsum rugose, side ridged. Hindcoxal dorsum with inner margin carinate, carina slightly expanded basally.

Setae (numbers in parentheses refer to setal length expressed as a fraction of basal mandibular width): erect on postocellar area (0.4–0.6), scutum (0.4–0.6 anteriorly), mesopleuron, midfemoral venter (0.3–0.4), and on each side of oral fossa next to occipital carina; diverging anterolaterad from midline on propodeal dorsum.

Head and thorax black, mandible red at two-thirds length. Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal and subcostal veins of forewing dark brown. Gaster and legs black, tarsal apex brown. Terga I–IV silvery fasciate apically (fasciae ill defined mesally).

♀.— Clypeus (Figs. 43a, c): middle section minimally, uniformly convex, nearly flat, with most or all punctures more than one diameter apart, bevel, as long as basomedian area or shorter; lip: see Variation below. Width of postocellar area 1.8–2.0 × length. Dorsal length of flagellomere I 1.7–2.0 apical width. Forefemoral venter with minute punctures that are several diameters apart (interspaces unsculptured). Dorsal foretibial surface with a few inconspicuous bristles, outer surface with one or two spines. Forebasitarsus with 5–7 rake spines. Apical depression of tergum V varying from micropunctate and microsetose to unsculptured, glabrous. Pygidial plate alutaceous, with shallow punctures that are many diameters apart. Length 6.1–7.6 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Figs. 43b, d): bevel shorter than basomedian area; lip free margin arcuate or sinuate, with prominent corner; distance between corners 0.8–1.1 × distance between corner and orbit. Width of postocellar area 2.4–2.8 × length. Dorsal length of flagellomere I 1.4–1.5 × apical width. Forefemoral notch glabrous. Outer margin of forebasitarsus mostly with 3–5 rake spines, but with only one preapical spine (near tarsomere's midlength) in some; outer apical spine of foretarsomere II shorter to longer than tarsomere III. Length 5.7–6.6 mm. Volsella and penis valve: Figs. 43e, f.

Variation.— Frons sculpture. The frons in many specimens is coriaceous (i.e., dull, conspicuously and unevenly microsculptured), with shallow, ill-defined punctures that are no more than one diameter apart. It is contrastingly shiny, with punctures several diameters apart and the interspaces unsculptured, in South African specimens from Matjiesfontein, Plessierivier, Willowmore, and Wolwekraal Farm.

Female clypeus. The clypeal lip is arcuate in most females and has a small lateral sinuosity on each side (Fig. 43c), but the sinuosity is absent in the lectotype, the females from Plessierivier, and some from Botswana. The lip has an obtuse median projection and a conspicuous lateral incision in the single female from Kitwe, Zambia.

Collecting period.— 11–26 January, 11 February, 20 March, 1 April–13 November, 18–22 November, 1–18 December.

Geographic distribution (Fig. 44).— Namibia, Zambia, Zimbabwe, Botswana, South Africa.

Records.— **BOTSWANA**: Serowe (3 ♀),

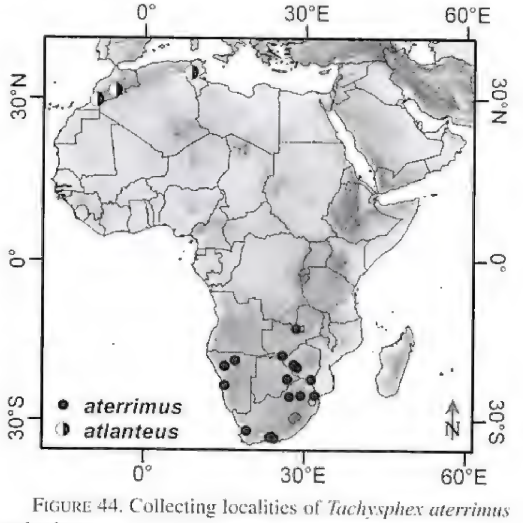

Figure 44. Collecting localities of *Tachysphex aterrimus* and *atlanteus*.

Serowe: Farmers Brigade (1 ♀, PPRI). **NAMIBIA**: **Okahandja District**: Okahandja (1 ♀, BMNH). **Outjo District**: 31 km SE Kamanjab (1 ♀, MS). **Swakopmund District**: Kuiseb River at Gobabeb (1 ♀). **Tsumeb District**: Namutoni (1 ♀, TMP, handwritten label Namuntoni). **SOUTH AFRICA**: **Eastern Cape Province**: Willowmore (1 ♀, TMP), 30 km S Steytlerville: Wolwekraal Farm (1 ♂, USU), 43 km NE Willowmore at Plessierivier (1 ♀, 1 ♂; 2 ♀, 1 ♂, USU). **Mpumalanga**: Komatipoort (1 ♂, PPRI), Loskop Dam Nature Reserve (1 ♂, PPRI). **Northern Province**: Pafuri in Kruger National Park (1 ♂). **North-West Province**: Rustenburg Nature Reserve (1 ♂). **Western Cape Province**: Matjiesfontein (1 ♂; 1 ♂, BMNH), 40 km E Clanwilliam: Sevilla (1 ♂). **ZAMBIA**: Kitwe (1 ♀, AMG). **ZIMBABWE**: Bulawayo (1 ♂; 6 ♀, 9 ♂, SAM, including lectotype of *aterrimus*; 1 ♀, 3 ♂, TMP), Sawmills (1 ♂, AMNH; 3 ♀ 6 ♂, SAM; 1 ♂, TMP), Victoria Falls (1 ♂, SAM, paralectotype of *aterrimus*). The specimen recorded by Arnold (1924) from Matobo is actually a *titania*.

Tachysphex atlanteus de Beaumont

Figures 44, 45.

Tachysphex atlanteus de Beaumont, 1955:177, ♀, ♂. Holotype: ♀, Morocco: Tafraout (LAUSANNE), examined before 1971.— Pulawski, 1971:341 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976: 272 (listed).

Recognition.— *Tachysphex atlanteus*, known from Morocco and Tunisia, has a convex labrum (markedly protruding from beneath the clypeus), galea in profile markedly longer than wide, and propodeal side uniformly microsculptured. It differs from similar species in having the setae suberect to erect on the postocellar impression (female) or the entire postocellar area (male) but slightly shorter than the midocellar diameter, and the setae of the lower gena at most slightly longer than the midocellar diameter. Subsidiary recognition features include: terga nonfasciate or with broadly interrupted fasciae, female forecoxa without an apical process and apical depression of tergum V impunctate and glabrous, and in the male the dorsal volsellar process low, rounded (Fig. 45c). The setae are suberect on the postocellar depression in many *calidus*, but those of the lower gena (next to the oral cavity) are contrastingly longer than the midocellar diameter, the terga are distinctly fasciate, the female forecoxa has an apical process and tergum V is uniformly setose throughout, and in the male the dorsal volsellar process is narrow and elongate (Fig. 78b). So far as known, the two species have exclusive geographic ranges: *atlanteus* occurs in Morocco and Tunisia, and *calidus* in sub-Saharan Africa, extending into southern Sahara.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea markedly longer than wide in profile, punctate (punctures more than one diameter apart near anterior margin, about one diameter apart near posterior margin), its length equal to 0.9 of scape in female, to 1.0 in male. Middle clypeal section conspicuously convex. Scutal punctures well defined in female, ill defined in male, about one diameter apart in some females and in males, up to 2–3 diameters apart on disk in other females. Mesopleuron dull, uniformly microareolate, impunctate. Propodeal dorsum evenly microareolate; side uniformly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect to erect on postocellar impression in female, on entire postocellar area in male, slightly shorter than midocellar diameter; mostly shorter than midocellar diameter on each side of oral fossa next to occipital carina, but some setae slightly longer; appressed on scutum; sublateral setae of propodeal dorsum oriented posterad and meeting apicomesally, admedian setae oriented obliquely posterad toward midline (oriented anterad near propodeal base); propodeal side glabrous anteriorly.

Head and thorax black, with the following reddish: mandible (except apically), clypeal bevel and lip, and pronotal lobe at least posteriorly. Frontal setae silvery or with golden tinge in female,

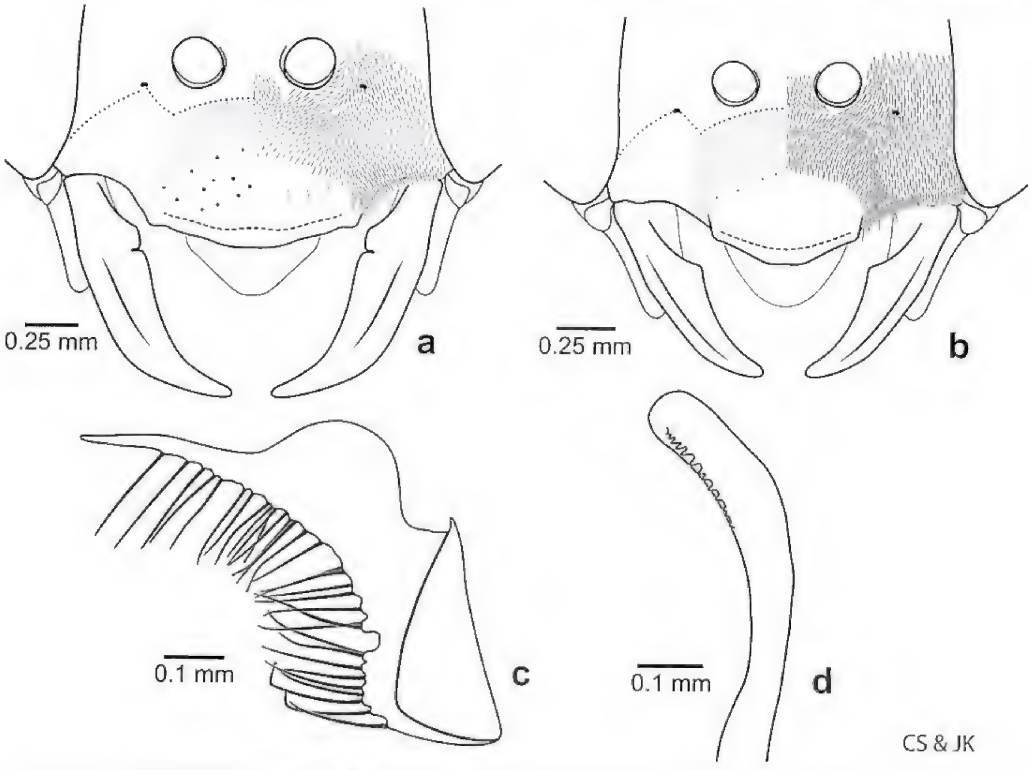

FIGURE 45. *Tachysphex atlanteus* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

golden in male. Wing membrane nearly hyaline; costal and subcostal veins of forewing reddish brown. Femora, tibiae, and tarsi red, but fore- and midfemora black basally in some females, and all femora partly black in some males. Gaster all red, apex darkened in some males. Terga not fasciate apically or basal terga with broadly interrupted fasciae (I and II, or II alone, or I–III).

♀.— Clypeus (Fig. 45a): bevel longer than basomedian area; lip free margin arcuate, with vestigial emargination mesally, not incised laterally. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.8–3.0 × apical width. Dorsal foretibial surface with two spines, outer surface with one or two spines, with micropunctures and setae somewhat sparser than on remaining surface. Forebasitarsus with 8 or 9 rake spines. Apical spines of hindtarsomere IV reaching claw bases. Tergum V sparsely punctate mesally, its apical depression impunctate, glabrous. Pygidial plate somewhat convex longitudinally in lateral view, with lateral margin low, not raising above plate's surface, with punctures averaging many diameters apart; interspaces unsculptured or aciculate. Length 12.2–13.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 45b): bevel about as long as basomedian area, delimited anterolaterally by obtuse, oblique carina that emerges from lip corner; lip free margin arcuate to straight, shallowly emarginate mesally in some specimens, with well-defined corner; distance between corners 0.9–1.2 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width. Forefemoral notch with bottom microscopically setose. Outer margin of forebasitarsus with 5–8 spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with

inner (= posterior) margin sharp in distal half. Length 7.5–9.5 mm. Volsella and penis valve: Figs. 45c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 44).— Morocco, Tunisia.

RECORDS.— **MOROCCO**: Ksar es Souk to Ouarzazate (1 ♂, paratype of *atlanteus*), Tafraout (3 ♂; 2 ♀, LAUSANNE; holotype and paratypes of *atlanteus*), Tinerhir (de Beaumont, 1955). **TUNISIA**: 8 km S Feriana (1 ♂).

***Tachysphex aureorufoniger* Pulawski, sp. nov.**

Figures 46, 47.

DERIVATION OF NAME.— *Aureorufoniger*, derived from the Latin masculine adjectives *aureus*, golden, *rufus*, red, and *niger*, black; referring to this species black body, red legs, and golden vestiture.

RECOGNITION.— *Tachysphex aureorufoniger* is one of the species in which the labrum is convex, markedly protruding from beneath the clypeus, the galea is longer than wide in profile, and the propodeal side is finely ridged throughout. In addition, its propodeal dorsum is longitudinally ridged at least basally, glabrous apicomesally (glabrous area at least twice as long as the midocellar diameter), the basomedian setae are oriented obliquely anterad, and the adlateral and apical setae oriented obliquely posterad (Fig. 46b). Also, the gaster is black and in fresh specimens the tergal fasciae are golden rather than silvery.

DESCRIPTION (male only).— Labrum convex, markedly protruding from beneath clypeus. Galea shiny, with punctures that are many diameters apart, longer than wide in profile, about as long as 1.1 of scape. Scutal and mesopleural punctures shallow, somewhat ill defined, most of them less than one diameter apart. Propodeal dorsum irregularly, longitudinally ridged at least basally (in some specimens subbasal ridges extend to about midlength, in others one or two median ridges extend nearly to dorsum's apex); side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; subappressed and shorter than midocellar diameter on each side of oral fossa adjacent to occipital carina; arranged in complicated pattern on propodeal dorsum (Fig. 46b): basomedian setae oriented obliquely anterad, adlateral and apical setae oriented obliquely posterad (but separated apicomesally by elongate, glabrous area that is at least twice as long as midocellar diameter).

Head, thorax, and gaster black, mandible reddish mesally. Wing membrane yellowish; costal vein of forewing reddish, subcostal vein reddish brown. Femora, tibiae, and tarsi red (except fore- and midfemora black basally). Setae golden on head and thorax in fresh specimens, becoming pale in worn ones. Terga I–V fasciate apically, fasciae golden in fresh specimens.

♀.— Unknown.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 46a): bevel about as long as basomedian area, delimited anterolaterally by small, obtuse carina that emerges from lip corner; lip free margin arcuate, shallowly emarginate mesally, with well-defined corner; distance between corners 1.2–1.4 × distance between corner and orbit. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.9 × apical width. Forefemoral notch with microscopically setose bottom. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 8.3–12.0 mm. Volsella and penis valve: Figs. 46c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 47).— Tanzania, Zambia.

RECORDS.— HOLOTYPE: ♂, **ZAMBIA**: **Eastern Province**: E side of Luangwa bridge at 14°59′S 30°13′E, 3 Mar 1998, WJP (CAS). PARATYPES: **TANZANIA**: **Morogoro Region**: 128 road km NW Morogoro,

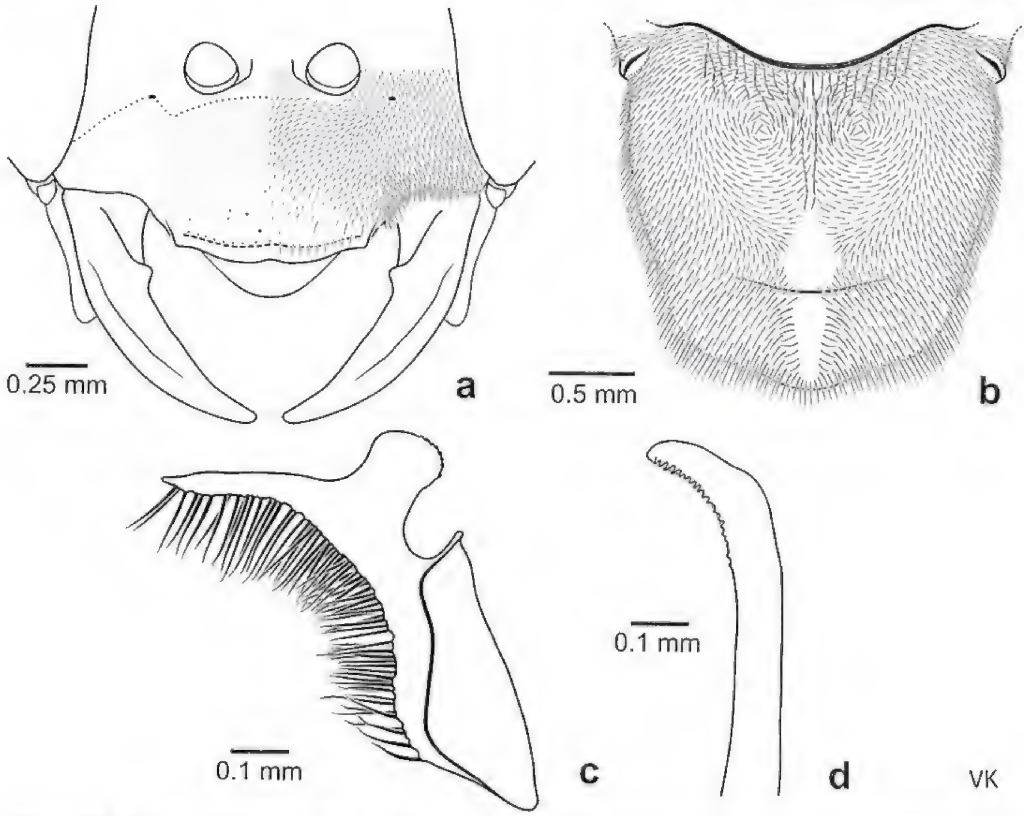

FIGURE 46. ***Tachysphex aureorufoniger*** Pulawski, sp. nov.: a – male clypeus and mandible; b – propodeal dorsum showing ridges and setal pattern; c – volsella; d – penis valve.

12 June 2001, M.H. Bourbin and WJP (2 ♂). **ZAMBIA**: **Central Province**: 2 km E Mumbwa, 31 Mar 1995, WJP (2 ♂); 7 km W Mumbwa, 30 Mar 1995, AM (1 ♂). **Eastern Province**: Chipata (as Fort Jameson), 3–6 June 1910, S.A. Neave (1 ♂, BMNH); E side of Luangwa bridge, 12 Mar 1998, WJP (2 ♂); 6–18 km SW Mfuwe, 20–22 Mar 1995, WJP (1 ♂); 31 km E Petauke, 17 Mar 1995, WJP (2 ♂); 32 km E Petauke, 24–26 Mar 1995, AM (3 ♂, MSNT) and WJP (8 ♂); 42 km WSW Petauke, 16 Mar 1995, WJP (1 ♂).

Tachysphex auropilosus R. Turner

Figures 48, 49.

Tachysphex auropilosus R. Turner, 1917a:321, ♀. Lectotype: ♀, Kenya: Simba (BMNH), **here designated**, examined.— Arnold, 1923a:173 (original description copied), 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed).

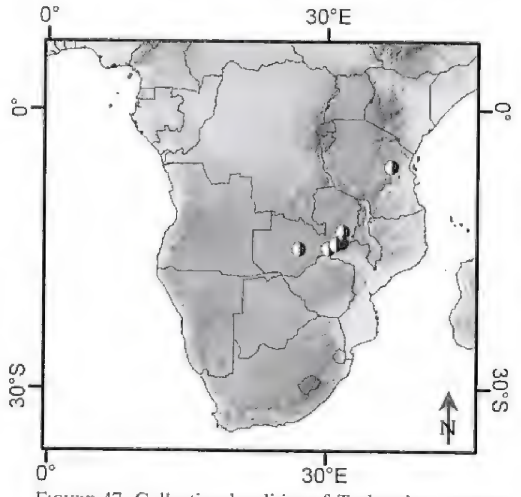

FIGURE 47. Collecting localities of *Tachysphex aureorufoniger*.

Recognition.— *Tachysphex auropilosus* has a labrum minimally convex adjacent to free margin, a galea slightly longer in profile than wide, and hindwing crossvein cu-a vertical. The following combination is diagnostic in both sexes: thoracic vestiture golden, free margin of clypeal lobe essentially arcuate but minimally concave laterally (Figs. 48a, b), and apical tarsomeres each with a group of spines on venter and lateral margins. In addition, female tarsomeres IV and V are characteristically modified (see Description below and Figs. 48c, d), and male tarsomeres V are expanded laterally (Figs. 48e, f). Subsidiary recognition features include: femora uniformly microsculptured, setae appressed on postocellar area, mesothorax, and femora, and gaster and legs all or largely red.

The female of *mzingeli* is similar, but in *auropilosus* the clypeal middle section has a sparsely punctate, subapical area (Fig. 48a); the wings are uniformly yellow; and apical tarsomeres have 2–4 spines on each lateral margin (Fig. 48d). In *mzingeli*, the middle clypeal section is uniformly punctate, the wings are either yellow basally and brown with a violet shimmer distally or all yellow, and the apical tarsomeres have one or two spines on each lateral margin. The female tarsi are also similar in *rapax* and *scopa* (in which setae are erect and sinuous on postocellar area, mesothorax, and femora), in *tanqua* (in which fore- and midfemoral venters are practically unsculptured), and in *harpax*. In the latter species, midtarsomere III averages shorter than in *auropilosus* (length 1.2–1.4 × apical width rather than 1.5 ×), the thoracic setae are silvery, the femora are black, and the body length does not exceed 11.0 mm (about 14.5 mm in *auropilosus*).

Description.— Galea longer than wide in lateral view (as long as 0.8 of scape), with large, sparse punctures and also minute punctures that are about 1–2 diameters apart (minute punctures absent near anterior margin). Free margin of labrum with short, stout setae (as in Fig. 178c). Scutum evenly, minutely punctate, punctures nearly contiguous. Mesopleuron microsculptured, dull, with evanescent punctures in Kenyan specimens, but punctures easily recognizable in those from Tanzania. Episternal sulcus complete in female but not in male. Propodeal dorsum evenly microareolate to ridged; side microsculptured, not ridged in specimens from Kenya, finely ridged in those from Tanzania. Hindcoxal dorsum with inner margin carinate basally. Sternum I with apical depression bisected by obtuse median carina.

Setae suberect on each side of oral fossa next to occipital carina (setal length less than one midocellar diameter); appressed on postocellar area and scutum; appressed and oriented posterad on propodeal dorsum except oriented anterad basomedially.

Head and thorax black, mandible reddish at about two-thirds of length. Frontal setae silvery or golden in female, golden in male; thoracic setae golden. Wing membrane yellow; forewing costal vein light brown, subcostal vein dark brown. Femora, tibiae, and tarsi red (forefemur black basodorsally, also midfemur in some specimens). Gaster all red in female or sterna black, in male either all red or tergum V and sterna V–VII largely black. Terga I–IV in female, I–V in male, fasciate apically (fasciae golden in female, silvery in male).

♀.— Clypeus (Fig. 48a): bevel rudimentary; lip free margin arcuate, not incised laterally. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.6 × apical width. Forecoxa with small but conspicuous apicomedian process. Dorsal foretibial surface with two spines, outer surface with several spines. Forebasitarsus with nine or 10 rake spines that are divided into a subbasal and an apical group. Tarsomeres IV: length about 1.1 × apical width, dorsoapical emargination rounded proximally (Fig. 48c). Tarsomeres V elongate, with one or two preapical spines on venter and a row of 2–4 spines at about midlength of each lateral margin (Figs. 48d, g); apicoventral margin produced into rounded lobe (Fig. 48d). Claws elongate, length of arolium about one-third of claw length (Figs. 48c, d). Apical depression of tergum V finely punctate and setose. Pygidial plate with punctures that average several diameters apart (but many punctures one diame-

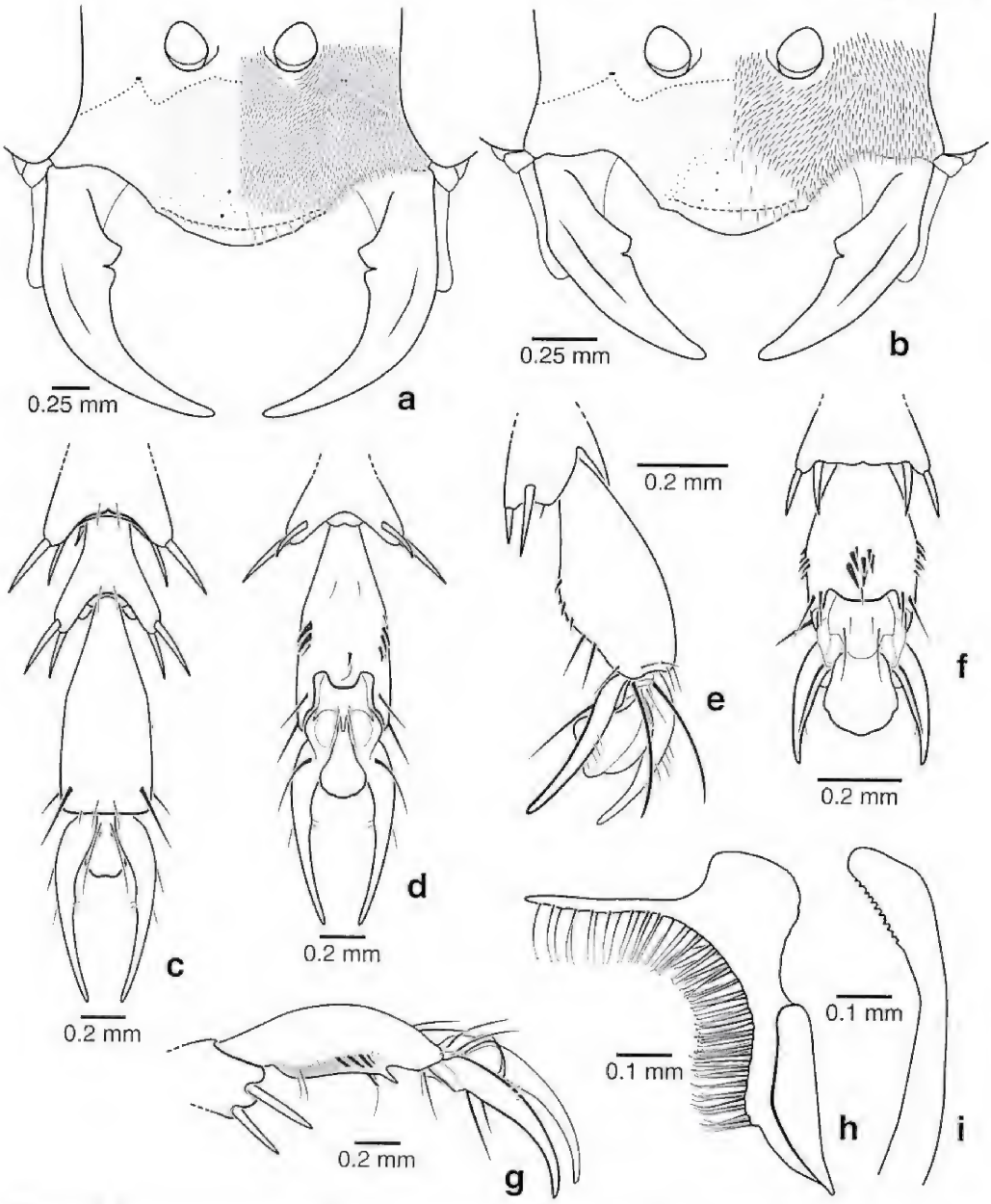

FIGURE 48. *Tachysphex auropilosus* R. Turner: a – female clypeus and mandible; b – male clypeus and mandible; c – apical hindtarsomeres of female in dorsal view; d – same in ventral view; e – apical hindtarsomeres of male in lateral oblique view; f – same in ventral view; g – apical hindtarsomere of female in lateral view; h – volsella; i – penis valve.

ter apart); interspaces aciculate, shiny. Length 14.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 48b): bevel about as long as basomedian area; lip free margin arcuate, somewhat concave laterally, with well-defined corner; corners about equidistant from each other and adjacent eye margin. Width of postocellar area

0.7–0.8 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width. Bottom of forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Tarsomeres V: venter with preapical cluster of small spines (Fig. 48f), each lateral margin expanded, with a row of small spines emerging from expansion (Fig. 48e). Length 9.0–9.9 mm. Volsella and penis valve: Figs. 48h, i.

GEOGRAPHIC DISTRIBUTION (Fig. 49).— Kenya, Tanzania.

RECORDS.— **KENYA: Coast Province**: Voi (1 ♀, BMNH). **Eastern Province**: Makindu (2 ♀, BMNH, including paralectotype of *auropilosus*), Simba (2 ♀, BMNH, including lectotype of *auropilosus*). **Rift Valley Province**: 26 mi SW Nairobi (1 ♂). **TANZANIA: Iringa Region**: 18 km W Iringa (2 ♂). **Tanga Region**: 2 km NE Mkomazi (1 ♀).

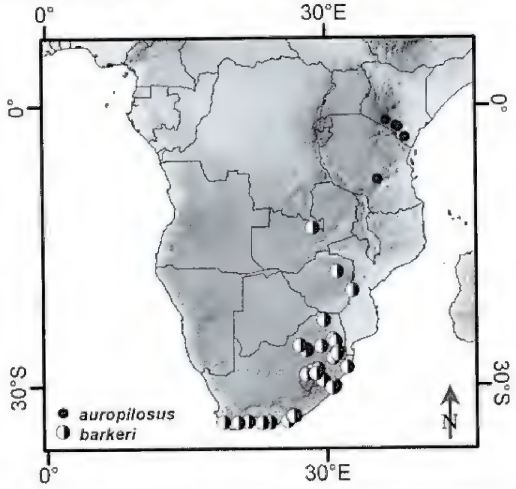

FIGURE 49. Collecting localities of *Tachysphex auropilosus* and *barkeri*.

Tachysphex bara Pulawski, sp. nov.

Figures 50–53.

DERIVATION OF NAME.— Named after the Bara people of Madagascar, who cohabit with this wasp; a noun in apposition to generic name.

RECOGNITION.— *Tachysphex bara*, an endemic of Madagascar, differs from all other species inhabiting that island by the combination of an all red gaster, setae of the propodeal dorsum inclined posterad (except basomedian setae erect), pygidial plate punctatorugose in the female (Fig. 50d), and male sterna IV–VI with erect setae (Fig. 51a), setal length being slightly more than one midocellar diameter. The rugose propodeal dorsum is also distinctive (Fig. 50c), although rugae are evanescent in many males. The pygidial plate is also rugose in exceptional females of *insulsus*. In that species, however, the propodeal dorsum is evenly microareolate, with the setae inclined anterad.

The presence, on the venter of apical tarsomeres, of a central spine in female (Fig. 50f) and at least two preapical spines in male (Fig. 51b) is a subsidiary recognition features of *bara*.

DESCRIPTION.— Galea in profile about as long as wide. Scutal punctures less than one diameter apart. Mesopleural punctures shallow, ill defined, interspaces microsculptured, dull. Episternal sulcus complete. Propodeal dorsum, in most specimens, irregularly rugose (Fig. 50c) and side ridged (dorsal rugae and lateral ridges evanescent in some males). Hindcoxal dorsum with inner margin carinate basally, carina not expanded.

Setae appressed on postocellar area and scutum, erect on each side of oral fossa next to occipital carina (setal length about one midocellar diameter); oriented posterad on propodeal dorsum (except basomedian setae erect).

Head and thorax black, mandible reddish mesally. Frontal setae with golden tinge, golden in some males. Wing membrane slightly infumate, almost hyaline; forewing costal vein light brown, subcostal vein dark brown. Femora black except apex red (apical third of hindfemur red in some females). Tibiae and tarsi red. Gaster all red or terga III–VI slightly darkened in some females. Terga I–III fasciate apically, but fasciae ill defined.

♀.— Clypeus (Fig. 50a): bevel shorter than basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area about 0.8 × length. Dorsal length of flagellomere I 1.9–2.1 × apical width. Dorsal foretibial surface with two or three spines, outer surface

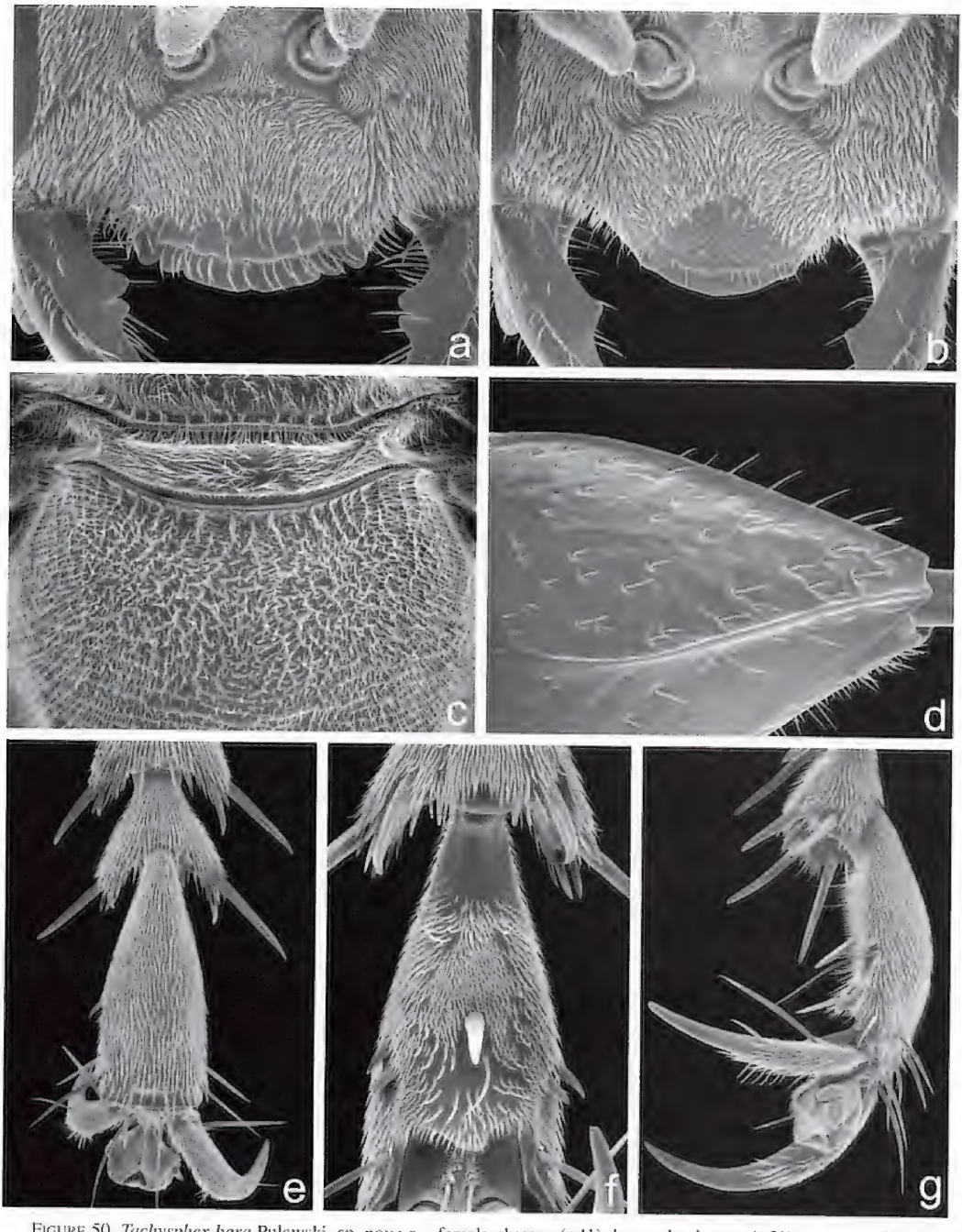

FIGURE 50. *Tachysphex bara* Pulawski, sp. nov.: a – female clypeus (×41); b – male clypeus (×51); c – propodeal dorsum of female in dorsal view (×36); d – female pygidial plate, lateral oblique view (×60); e – female tarsomeres IV and V in dorsal view (×57); f – female hindtarsomere V in ventral view (×102); g – female tarsomeres IV and V in lateral view (×60).

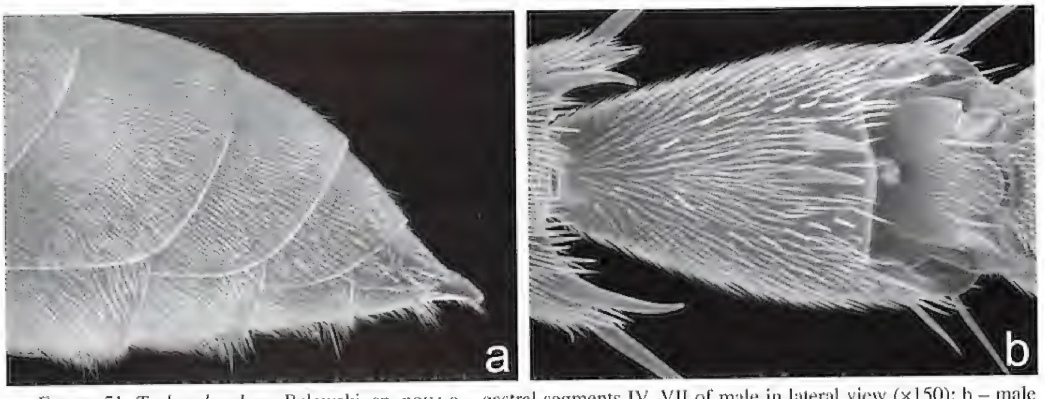

FIGURE 51. *Tachysphex bara* Pulawski, sp. nov.: a – gastral segments IV–VII of male in lateral view (×150); b – male hindtarsomere V, ventral view (×150).

with several spines. Forebasitarsus with 15–18 rake spines. Tarsomeres IV obtusely emarginate dorsoapically (Fig. 50e), with almost straight apicoventral margin (Fig. 50f); their apical width slightly more than length on fore- and midtarsi, equal to length on hindtarsus. Apical tarsomeres V slightly elongate (Fig. 50e), not angulate basoventrally, venter with erect microsetae (Fig. 50g) and one central spine, each lateral margin with one or two small spines behind midlength; apicoventral margin triangular (Fig. 50f). Apical depression of tergum V impunctate, glabrous. Pygidial plate irregularly punctatorugose (Fig. 50d). Length 10.5–13.0 mm.

♂.— Mandible: trimmal carina with cleft and prominent tooth. Clypeus (Fig. 50b): bevel ill defined or absent; lip free margin arcuate, corner obtuse but well defined; distance between corners 0.9–1.0 × distance between corner and orbit. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.6–1.7 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with two (occasionally three) small, preapical spines (Fig. 51b). Sternal punctures increasing in size toward gastral apex. Sterna IV–VI with erect setae (also apical depressions of sterna II and III), setal length slightly more than midocellar

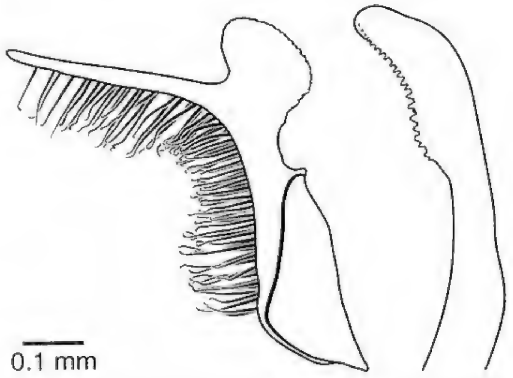

FIGURE 52. *Tachysphex bara* Pulawski, sp. nov.: volsella and penis valve.

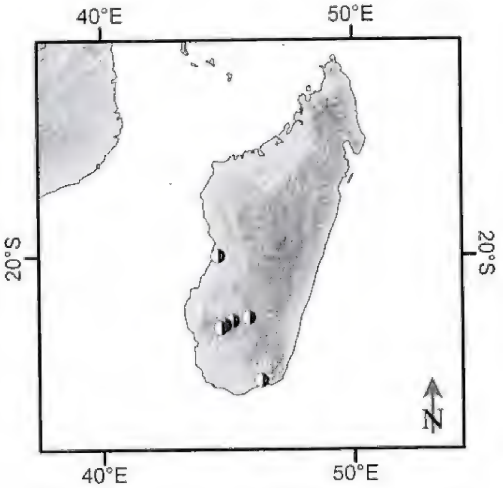

FIGURE 53. Collecting localities of *Tachysphex bara*.

diameter (Fig. 51a) Sternum VIII shallowly emarginate apically, hindmargin arcuate mesally in some specimens. Length 8.5–9.5 mm. Volsella and penis valve: Fig. 52.

GEOGRAPHIC DISTRIBUTION (Fig. 53).— Madagascar.

RECORDS.— HOLOTYPE: ♀, **MADAGASCAR: Fianarantsoa**: Isalo National Park at 22°36′S 45°10′E, 18–19 Mar 1994, WJP (CAS). PARATYPES: **MADAGASCAR: Fianarantsoa**: same data as holotype (3 ♀); same data but AM (1 ♀, MSNT); same locality but 14 Apr, WJP (2 ♀); 40 road km W Ihosy, 16 Apr 1994, WJP (1 ♀). **Toliara**: Bereboka 60 km NE Morondava, 18–23 May 1983, J.S. Noyes and M.C. Day (6 ♀, 3 ♂, BMNH); Berenty, 2–9 Apr 1994, WJP (1 ♀, 1 ♂); 38 km E Sakaraha, 21 Mar 1994, WJP (5 ♀, 5 ♂) and AM (1 ♀, 1 ♂, MSNT), same locality but 14 Apr, WJP (1 ♀, 1 ♂); Zombitsy Nature Reserve 16 km E Sakaraha at 22°53′S 44°42′E, 20 Apr 1998, M.E. Irwin and E.I. Schlinger (1 ♂).

Tachysphex barkeri Arnold

Figures 49, 54, 55.

Tachysphex barkeri Arnold, 1923:158, ♀ (as *Barkeri*, incorrect original capitalization). Holotype: ♀, South Africa: Kwazulu-Natal: Umbogintwini (DURBAN), examined.— Arnold, 1929c:385 (variation), 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed).

Tachysphex braunsi var. *debilis* Arnold, 1924:64, ♂, junior primary homonym of *Tachysphex debilis* Pérez, 1907 (now in *Tachytes*), and of *Tachysphex debilis* R. Turner, 1908 (a senior invalid synonym of *subopacus* R. Turner, 1910). Holotype: ♂, South Africa: Mpumalanga: Piet Retief (TMP), examined. **New synonym.**

Tachysphex braunsi var. *boer* Arnold, 1929:387. Substitute name for *Tachysphex braunsi* var. *debilis* Arnold.— As *Tachysphex braunsi boer*: Bohart and Menke, 1976:272 (new status, listed).

As *Tachysphex diabolicus*: de Beaumont, 1967:509 (South Africa), **present correction.**

RECOGNITION.— As in *brachypus*, the labrum of *barkeri* is not protruding or minimally protruding beyond the clypeal free margin and obtusely pointed mesally, and the galea is longer than wide in profile, with the lateral surface concave in most specimens (a unique such feature among *Tachysphex* but possibly an artifact resulting from desiccation).

Other significant features shared by the females of these two species include: tarsi unusually short (e.g., length of foretarsomere II and of midtarsomere III about equal to apical width), ventral midfemoral margin evenly convex except contrastingly concave preapically (as in Fig. 327c), body black, forebasitarsus with apical margin emarginate (Fig. 54d) and only two or three apical rake spines (Fig. 54d) with contiguous sockets, and pygidial plate densely punctate, with most punctures less than one diameter apart (Fig. 54e). The female of *barkeri* differs from that of *brachypus* in having the propodeal side finely ridged (rather than unridged), the clypeal lobe wider (distance between lip corners 1.4–1.6 × distance between corner and orbit rather than about 1.1), the flagellum thicker (e.g., length of flagellomere III 1.3–1.4 × apical width rather than 1.7–1.8), and the well-defined sensory areas on flagellomeres III–X (rather than inconspicuous).

The male of *barkeri* has an unusually short flagellomere I whose ventral length is slightly less than the apical width (Fig. 55c); a moderately elongate flagellomere II (ventral length about 1.6 × that of flagellomere I); slightly shortened tarsi (e.g., length of midtarsomeres II and III 1.8–2.0 and 1.2 × apical width, respectively); and the propodeal side is ridged, although ridges may be evanescent. *Tachysphex brachypus* is similar, but has the propodeal side unridged. The flagellar and tarsal proportions are also similar in *eurystoma*, in which, however, the propodeal side is not ridged, the galea is shorter than wide in lateral view and not concave, the clypeal lobe is broader (distance between lip corners 1.3 × clypeal midline, while 1.0–1.1 × in *barkeri*), and the forebasitarsus has two or three preapical rake spines (no such spines or one spine in *barkeri*).

JUSTIFICATION OF NEW SYNONYMY.— The holotypes of *barkeri* and *boer* are the opposite sexes of one species. These names are therefore synonyms.

Description.— Galea longer than wide in profile (about as long as 0.9 of scape), with lateral surface concave in most specimens; shiny, with evanescent, sparse punctures (except densely punctate anteriorly). Labrum obtusely pointed mesally (Fig. 54c), not exposed or barely exposed. Scutum evenly punctate, punctures averaging about one diameter apart in female, less than that in male. Mesopleural punctures, beneath scrobe, averaging about 2–3 diameters apart in female and about 1–2 diameters in male; interspaces conspicuously microsculptured, dull. Episternal sulcus complete in many females and some males. Propodeal dorsum varying: irregularly rugose and with longitudinal ridges, or irregularly rugose, or evenly microareolate; side finely ridged (ridges evanescent in some specimens). Hindcoxal dorsum with inner margin carinate basally, carina somewhat expanded.

Setae erect on postocellar area, about as long as midocellar diameter; erect on each side of oral fossa next to occipital carina, about 0.2 × basal mandibular width; practically appressed on scutum; markedly shorter than midocellar diameter on midfemoral venter; oriented posterad on propodeal dorsum.

Head, thorax, and gaster black, mandible black or dark reddish mesally. Frontal setae silvery in female, golden or with golden tinge in male. Wing membrane slightly infumate or yellowish; forewing costal vein brown, subcostal vein dark brown. Femora black (red apically in some males); tibiae and tarsi black in female, varying from all black to all red in male. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 54a): bevel markedly shorter than basomedian area; lip sinuate or obtusely prominent mesally, with two lateral incisions on each side. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 1.3–1.4 × apical width; ventral surface of flagellomeres III–X with characteristic sensory areas (as in Figs. 38c-e). Forefemoral venter minutely, evenly punctate, punctures 2–3 diameters apart (posteroventral surface with punctures that are many diameters apart in a female from Vernon Crookes Nature Reserve, South Africa). Dorsal foretibial surface with a few inconspicuous bristles, outer surface with several bristles, partly impunctate and glabrous toward apex. Ventral midfemoral margin evenly convex except contrastingly concave preapically (as in Fig. 327c). Tarsi short: length of fore- and midtarsomeres II 1.1 × and 1.6 × apical width, respectively; that of midtarsomere III equal to apical width (Fig. 55b); and that of fore-, mid- and hindtarsomeres IV about 0.9, 0.9, and 1.0 × apical width, respectively. Forebasitarsus: apical margin with characteristic angulate emargination (Fig. 54d); outer margin with seven or eight rake spines (which are compressed dorsoventrally); only two or three apical spines with contiguous sockets; length of apical spines about 1.2 × basitarsus width. Apical tarsomeres stout; venter with preapical group of minute spines (or at least one spine); lateral margins, in some specimens, with small spine near midlength (spines may be absent on all legs or on one side of each leg). Apical depression of tergum V impunctate and glabrous except basally and laterally. Pygidial plate slightly emarginate apically, with numerous large and numerous small punctures, many of which are less than one diameter apart (Fig. 54e). Length 9.5–11.7 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 54e): bevel rudimentary or absent; lip free margin arcuate to obtusely pointed, with well-defined corner; distance between corners 1.0–1.1 × distance between corner and orbit. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.0–1.1 × apical width, ventral length slightly less than apical width (Fig. 55c). Forefemoral notch of medium size or slightly larger than average for the genus (Fig. 54f), glabrous or microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomere II 1.8–2.0 × apical width, that of midtarsomere III 1.2 × apical width (Fig. 55d). Venters of tarsomeres V each with one preapical spine. Apex of sternum VIII varying from tridentate to shallowly emarginate (with

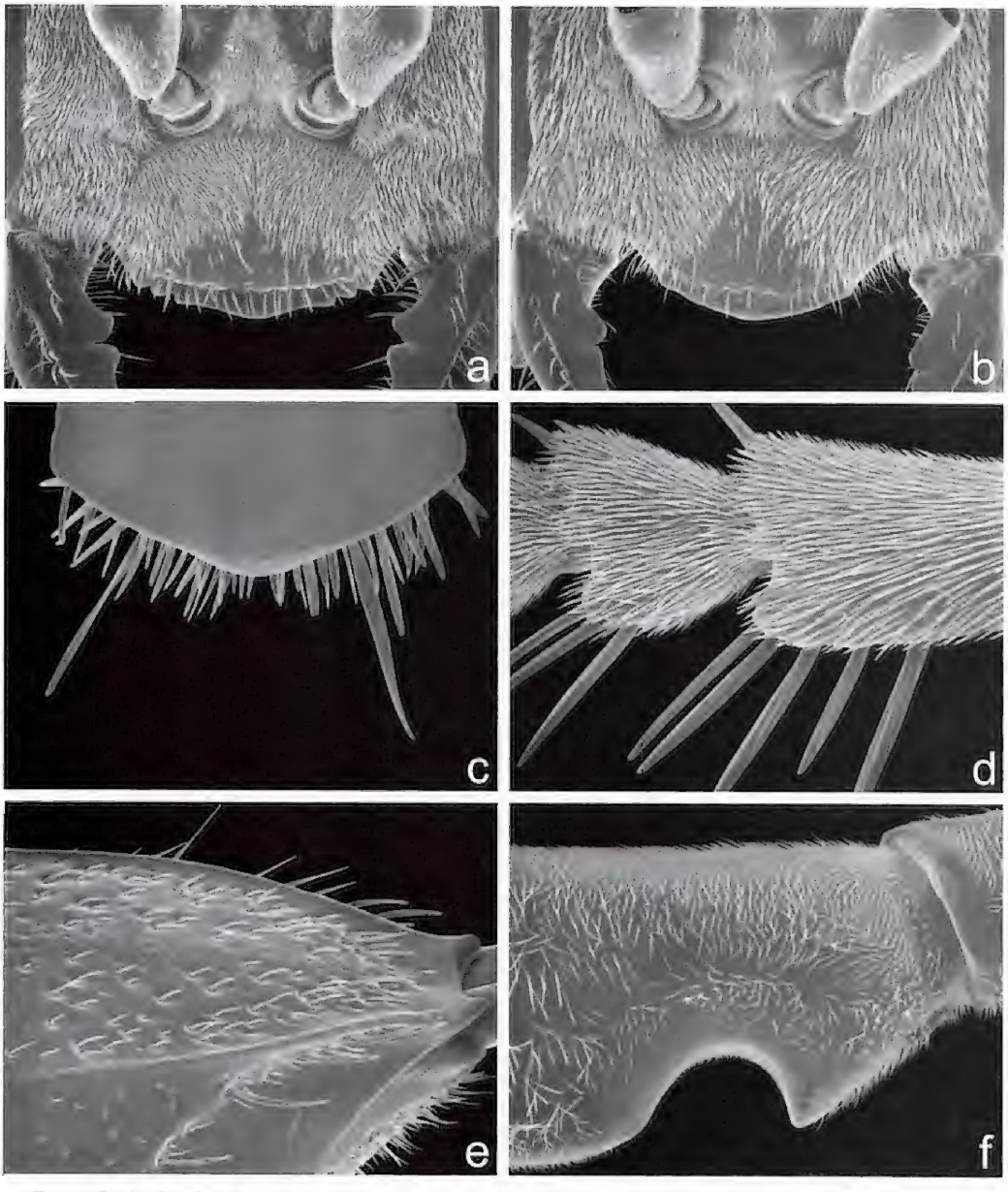

FIGURE 54. *Tachysphex barkeri* Arnold: a – female clypeus (×32); b – male clypeus (×44); c – female labrum (×96); d – apex of female foretarsomere I and foretarsomere II (×90); e – pygidial plate of female in lateral oblique view (×72); f – base of male forefemur (×90).

hindmargin straight between lateral prongs). Length 6.8–8.5 mm. Volsella and penis valve: Figs. 55e, f.

GEOGRAPHIC DISTRIBUTION (Fig. 49).— Zambia, Zimbabwe, Swaziland, and South Africa.

RECORDS.— SOUTH AFRICA: **Eastern Cape Province:** Algoa Bay (2 ♀, TMP), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (3 ♀, AMG), Grahamstown (1 ♂, AMG), 18 km WNW Grahamstown:

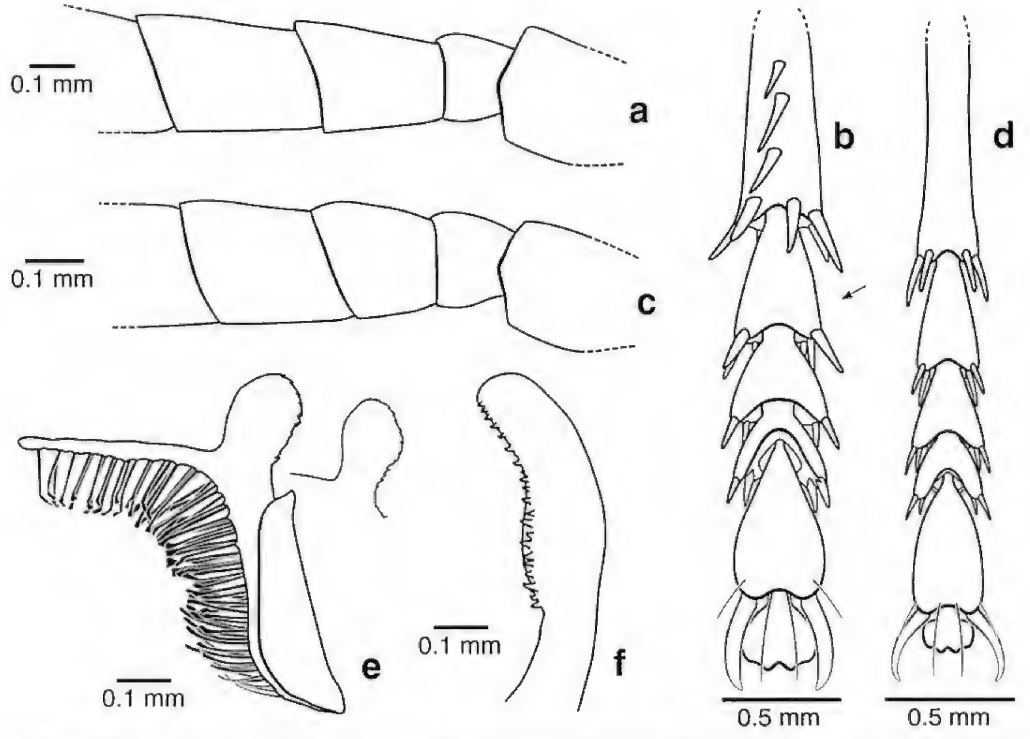

FIGURE 55. *Tachysphex barkeri* Arnold: a – basal flagellomeres of female; b – female midtarsus; c – basal flagellomeres of male; d – male midtarsus; e – volsella; f – penis valve.

Hilton Farm (2 ♀, 1 ♂, AMG), Howison's Poort 6 km WSW Grahamstown (2 ♀, AMG), Strowan Farm 5 air km W Grahamstown (1 ♂, AMG), Tsitsikama Forest: Oakhurst (1 ♀, 2 ♂, AMG;). **Free State**: Adullam Farm near Clarens at 28°32′S 28°28′E (1 ♀, 1 ♂, PPRI), Ficksburg (1 ♂, BMNH), Harrismith (1 ♂, BMNH). **Gauteng**: Johannesburg: Melville Koppies Reserve (1 ♂, FSCA), Krugersdorp: Witpoortjie (1 ♀, AMG), Strubens Valley: Florida (1 ♂; 1 ♀, 5 ♂, AMG). **Kwazulu-Natal**: Cathedral Peak (1 ♂, KU), Hluhluwe Game Reserve (1 ♀, 1 ♂, ZMLU; ♂ determined as *Tachysphex diabolicus* by de Beaumont), Kamberg National Park in Drakensberg Mts. (1 ♀; 3 ♀, 1 ♂, ZMAN), Natal National Park (1 ♀, 4 ♂, BMNH), Scottburgh (1 ♂, AMG), Umbogintwini (1 ♀, DURBAN, holotype of *barkeri*), Vernon Crookes Nature Reserve: Umzinto at 30°17′S 30°37′E (2 ♀; 3 ♀, 1 ♂ PPRI). **Mpumalanga**: Mac Mac Falls 10 km N Sabie at 25°02′S 30°48′E (2 ♂, PPRI), Middelburg (1 ♀, AMG), Piet Retief (1 ♀, 1 ♂, TMP, including holotype of *boer*), White River (1 ♂; 2 ♂, RMNH). **Northern Province**: Happy Rest Nature Reserve at 22°59′S 29°46′E (2 ♂; 2 ♀, 4 ♂, PPRI). **North-West Province**: Rustenburg Nature Reserve (2 ♀, 2 ♂; 3 ♀, 2 ♂, PPRI). **Western Cape Province:** Knysna (1 ♂, PPRI), Langberg (2 ♀; 7 ♀, 1 ♂, OÖLM), Stellenbosch: Jonkershoek (2 ♀, PMA), Swellendam (1 ♂; 1 ♂, BMNH). **Location unknown**: Kruger National Park: no specific locality (1 ♀, 2 ♂, BMNH). **SWAZILAND**: Malkerns Research Station (2 ♂, ZMAN), Mdzimba Hills (4 ♀, ZMAN), Usutu Forest (1 ♀; 2 ♀, ZMAN). **ZAMBIA**: 45 km SE Kitwe (1 ♂, OÖLM). **ZIMBABWE**: Chimanimani (1 ♂), Chishawasha near Harare (1 ♂, BMNH).

Tachysphex bemba Pulawski, sp. nov.

Figures 56, 57.

DERIVATION OF NAME.— Named after the Bemba people, one of the main ethnic groups of Zambia; a noun in apposition to generic name.

Recognition.— *Tachysphex bemba* has a convex labrum (markedly protruding beyond the clypeal free margin) and the propodeal dorsum glabrous apicomesally, with most basomedian setae pointing obliquely anterad. Unlike other species with this character combination, the female has the clypeal lip not incised laterally, legs black, and a pygidial plate conspicuously microsculptured, dull, with ill-defined punctures. The male has a slightly arcuate clypeal lip (Fig. 56b), well-developed foretarsal rake (basitarsus with four or five spines), and appressed sternal setae. The gaster is bicolored in most specimens (red basally, black apically), but all black in some.

Description.— Labrum convex, markedly protruding beyond clypeal free margin. Galea with variable punctation (dense to sparse), as long as 0.9–1.0 of scape. Scutal punctures minute, no more than one diameter apart, interspaces shiny in most specimens, dull in some. Mesopleuron dull, uniformly microsculptured in female; in male with shallow, inconspicuous punctures that are about one diameter apart at center (interspaces microsculptured but somewhat shiny). Propodeal dorsum evenly microsculptured, in many specimens also with fine ridges that may extend nearly to hind-margin mesally (Fig. 56c); side ridged in females and some males, ridges evanescent or absent in many males. Hindcoxal dorsum with inner margin carinate basally. Sternum I in some females with evanescent, longitudinal carina.

Setae nearly appressed on each side of oral fossa next to occipital carina (setal length about equal to midocellar diameter); appressed on postocellar area and scutum; oriented posterad on propodeal dorsum except for glabrous, apicomedian area that may be nearly rounded or markedly elongate longitudinally (Fig. 56c).

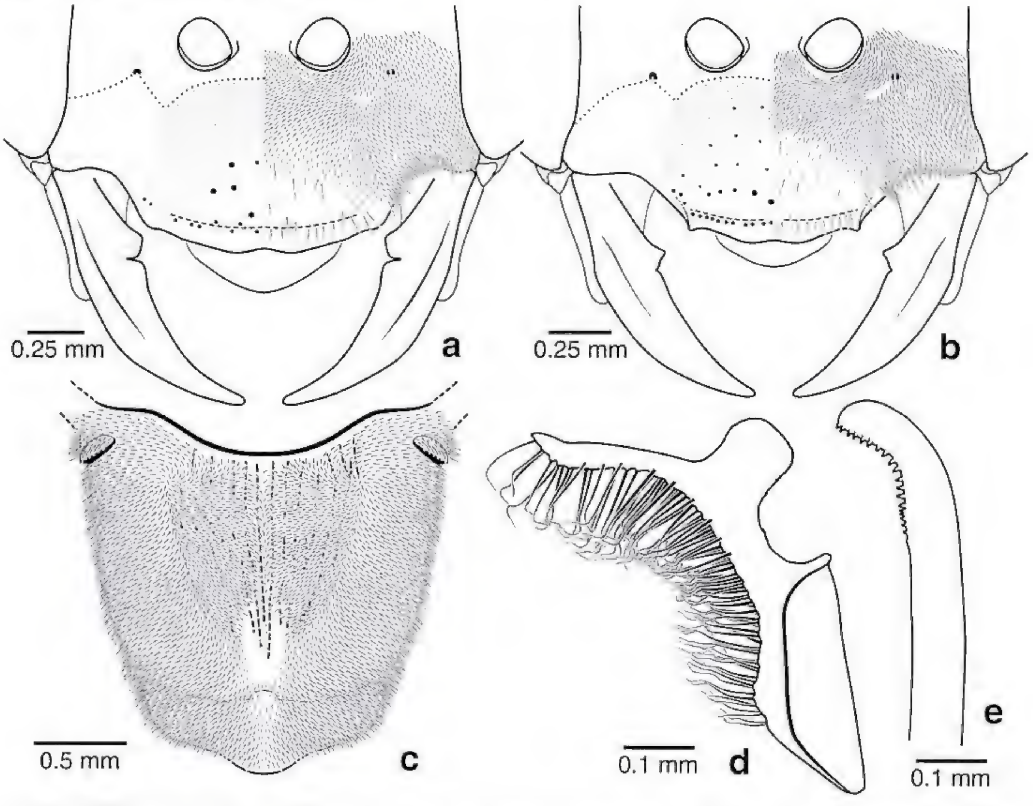

Figure 56. *Tachysphex bemba* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum showing ridges and setal pattern; d – volsella; e – penis valve.

Head and thorax black, mandible reddish at about two thirds of length. Frontal setae silvery in most females (golden in single female from Luvumbu Valley, Zambia), golden in male (silvery next to antennal sockets in some specimens). Scutal setae with golden tinge in male. Wing membrane slightly infumate; costal and subcostal veins of forewing brown. Color of legs: see below. Gastral segments I–III red in most specimens (sternum III black in many males), remainder black; but gaster all black in single female from Aroab area, Namibia. Terga I–III (I–IV in some males) silvery fasciate apically, fasciae golden rather than silvery in single female from Waldau River, Namibia.

♀.— Clypeus (Fig. 56a): bevel shorter than basomedian area; lip free margin arcuate, shallowly emarginate mesally, somewhat sinuous laterally. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 2.4–2.6 × apical width. Dorsal foretibial surface with one or two spines, outer surface with one or two spines. Forebasitarsus with 5–7 rake spines. Outer margin of foretarsomere IV slightly shorter than inner margin. Tergum V densely punctate and setose throughout, including apical depression. Pygidial plate conspicuously microsculptured, dull (except at very apex), with minute punctures that average many diameters apart. Length 10.0–10.2 mm. Legs black, tarsal apex brownish.

♂.— Mandible: trimmal carina with tooth, with or without cleft. Clypeus (Fig. 56b): bevel to longer than basomedian area; lip free margin slightly arcuate, shallowly emarginate mesally, with well-defined corner that is sharply projecting in most specimens, with short carina emerging from corner; distance between corners 1.1 × distance between corner and orbit. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 1.6–1.7 × apical width. Forefemoral notch with microscopically setose bottom. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 6.6–9.2 mm. Volsella and penis valve: Figs. 56d, e. Femora black in most specimens but red in males from Chibombo, Zambia; tibiae varying from all red to largely black; tarsi red.

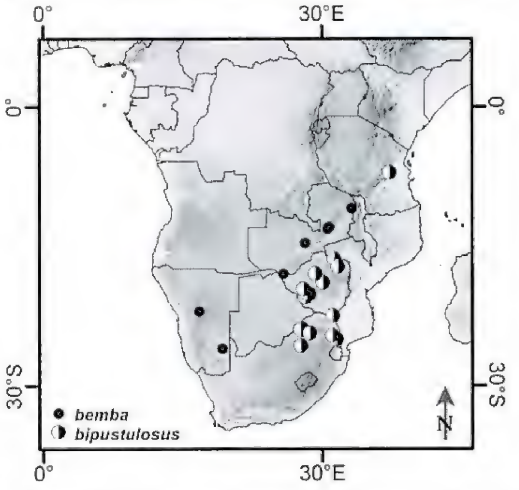

FIGURE 57. Collecting localities of *Tachysphex bemba* and *bipustulosus*.

GEOGRAPHIC DISTRIBUTION (Fig. 57).— Zambia, Namibia, northwestern Zimbabwe.

RECORDS.— HOLOTYPE: ♀, **ZAMBIA: Northern Province**: 54 road km NE Serenje at 13°05′S 30°35′E, 23 Mar 1998, WJP (CAS). PARATYPES: **NAMIBIA: Keet-man-shoop District**: 102 km from Aroab on road to Koës, 15 May 1973, J. Jacot-Guillarmod (1 ♀, AMG). **Okahandja District**: Waldau River 17 km W Okahandja, 13–14 Feb 1996, WJP (1 ♀). **ZAMBIA: Central Province**: Chibombo 97 road km N Lusaka, 14 Mar 1998, WJP (2 ♂); 54 road km NE Serenje, 17 Mar (5 ♂) and 23 Mar 1998, WJP (4 ♂). **Eastern Province**: Luvumbu Valley [20 km N Chama], 19–26 July 1910, S.A. Neave (1 ♀, BMNH). **Northern Province**: 65 road km NE Serenje, 22 Mar 1998, WJP (1 ♂); 82 road km NE Serenje, 22 Mar 1998, WJP (2 ♂). **ZIMBABWE**: Victoria Falls, 28–31 Mar 1998, WJP (1 ♀).

Tachysphex bipustulosus Arnold

Figures 57–59.

Tachysphex bituberculatus Arnold, 1923:162, ♀, junior primary homonym of *Tachysphex bituberculatus*

Cameron, 1905. Holotype: ♀, Zimbabwe: Bulawayo (SAM), examined.— Arnold, 1924:61 (description of ♂), 1930:3 (in checklist of Afrotropical Sphecidae).

Tachysphex bipustulosus Arnold, 1949:275. Substitute name for *Tachysphex bituberculatus* Arnold.— Bohart and Menke, 1976:272 (listed).

Recognition.— *Tachysphex bipustulosus*, occurring south of the equator, has the supraantennal swelling conspicuously expanded, higher than the antennal socket rim but not connected to the latter, and with lateral sides almost perpendicular to the frons plain (Figs. 58c–e); in addition, the socket rim is markedly higher dorsally than ventrally. The supraantennal swelling is enlarged in two other southern African species, *mashona* and *ovambo*. In *mashona*, however, the supraantennal swelling is fused with the antennal socket rim, and in *ovambo* it is lower and more rounded than in *bipustulosus*, with lateral sides sloping obliquely. Subsidiary recognition features of *bipustulosus* are: propodeal side microsculptured, not ridged; female flagellomere I short (dorsal length 1.4 × apical width) and tarsi shortened (e.g., length of foretarsomere II and of midtarsomere III about equal the apical width, whereas in *ovambo* 1.2 and 1.3 × apical width, respectively), and male sterna densely, uniformly setose. The only other species with an expanded supraantennal swelling, the Palearctic *pusulosus*, conspicuously differs from *bipustulosus* and its relatives (see *pusulosus* for differences, p. 522).

Description.— Antennal socket rim markedly higher dorsally than ventrally; supraantennal swelling conspicuously enlarged, higher than socket, separated from the latter, and with lateral sides almost perpendicular to the frons plain (Figs. 58c–e). Scutum evenly punctate, discal punctures slightly less to slightly more than one diameter apart. Mesopleural punctures fine (evanescent in the smallest male), about one diameter apart anteriorly and 2–3 diameters apart posteriorly; interspaces microsculptured, dull. Propodeal dorsum evenly microareolate, side sparsely, microscopically punctate, not ridged or with microscopic ridges anteriorly. Hindcoxal dorsum with inner margin carinate basally. Sternum I without longitudinal carina in female, with carina that bisects apical depression in male.

Setae appressed on postocellar area, scutum, and midfemoral venter; inclined, about 0.2 × basal mandibular width on each side of oral fossa next to occipital carina; inclined posterad on propodeal dorsum.

Head, thorax, and gaster black, mandible reddish preapically. Frontal setae silvery in female, silvery or golden in male. Wing membrane slightly infumate; forewing costal vein light brown, subcostal vein brown (respectively brown and black in single male from Tanzania). Color of legs varying in female but tarsi red; in male tibiae and tarsi red (see also Variation below). Terga I–IV silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 58a): bevel shorter than basomedian area; lip free margin arcuate or sinuate, with two lateral incisions on each side. Width of postocellar area 1.2 × length. Dorsal length of flagellomere I 1.4 × apical width. Dorsal foretibial surface with a few short, evanescent bristles, outer surface with two bristles but no spines. Tarsi short: length of fore- and midtarsomeres II about 1.0 and 1.6 × apical width, respectively; that of midtarsomere III equal to apical width (Fig. 58f); of fore-, mid-, and hindtarsomeres IV about 0.9 ×, 1.0 ×, and 1.0 × apical width, respectively. Forebasitarsus with eight rake spines, spines flattened dorsoventrally. Apical tarsomeres stout. Apical depression of tergum V impunctate, glabrous. Pygidial plate narrowly but conspicuously incised apically (Fig. 58g), punctures varying (see Variation below). Length 6.5–7.8 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 58b): bevel ill defined, markedly shorter than basomedian area; lip free margin roundly, obtusely triangular, with somewhat ill-defined corner; distance between corners 1.0 × distance between corner and orbit (0.8 in

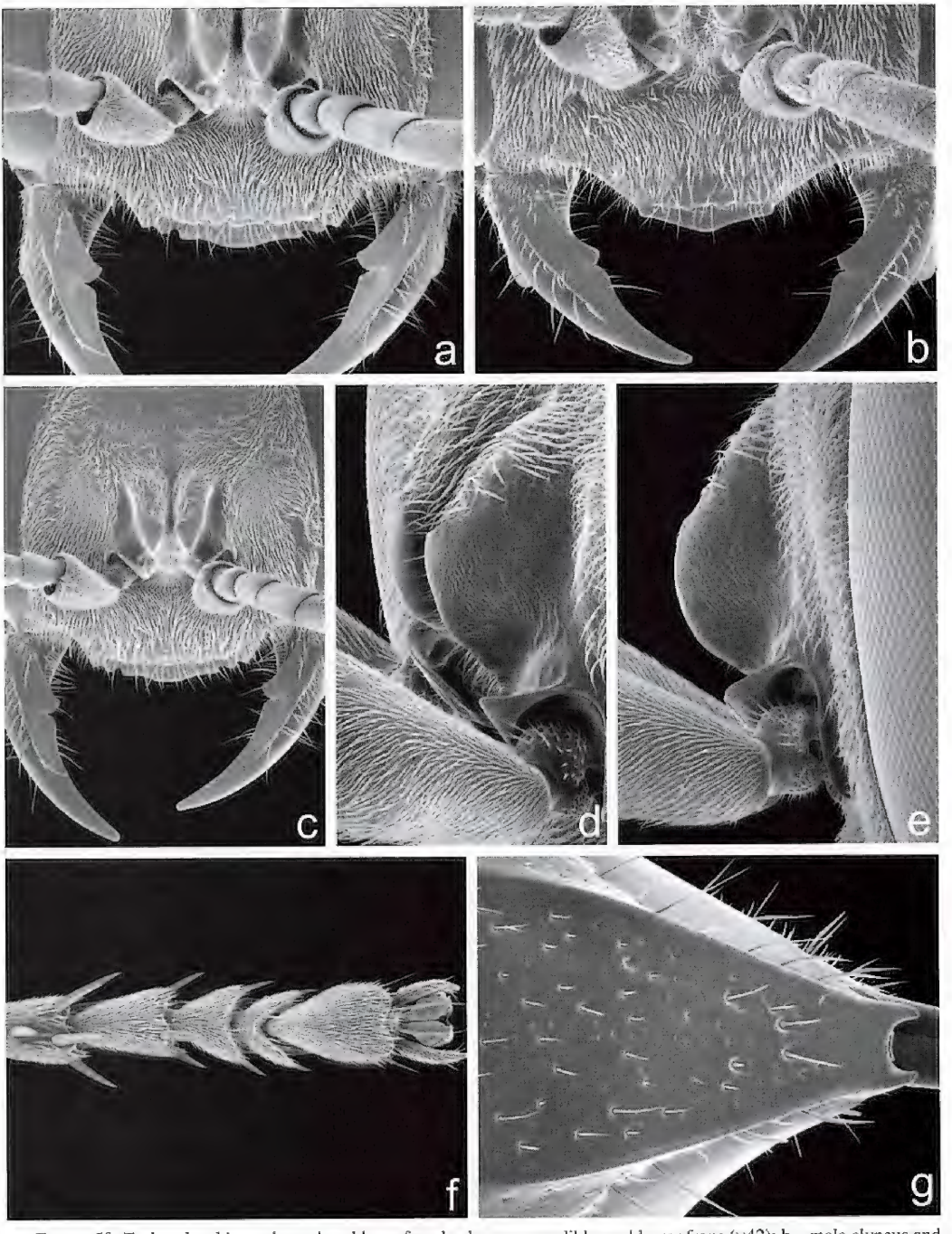

FIGURE 58. *Tachysphex bipustulosus* Arnold: a – female clypeus, mandible, and lower frons (×42); b – male clypeus and mandible (×54); c – central portion of female head showing supraantennal swelling, frontal view (×32); d – antennal socket and supraantennal swelling of female in lateral oblique view (×108); e – antennal socket and supraantennal swelling of female in lateral view (×108); f – female midtarsomeres II–V (×57); g – pygidial plate of female (×108).

Tanzanian male). Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I about 1.25 × apical width, ventral length equal to apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomere II 2.0–2.2 × apical width, that of midtarsomere III 1.4–1.6 × apical width. Venters of tarsomeres V each with one preapical spine. Apical margin of sternum VIII with or without median tooth. Length 8.0–9.0 mm. Volsella and penis valve: Figs. 59.

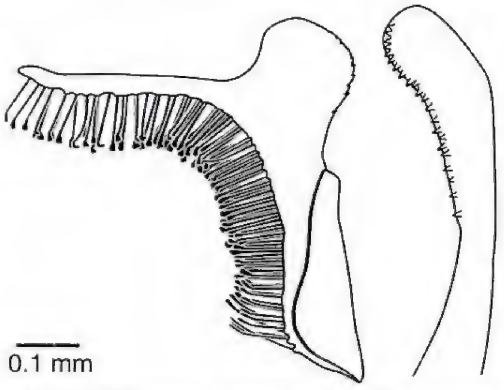

FIGURE 59.*Tachysphex bipustulosus* Arnold: volsella and penis valve.

VARIATION.— In the Zimbabwean specimens, the supraantennal swelling is about two antennal socket diameters long (Fig. 58c), gradually sloping down dorsad (Figs. 58d, e), and punctate in dorsal half. In the female, the punctures of the pygidial plate average several diameters apart at center, and the femora and tibiae are black. In the male, the femora all black or red only apically.

In specimens from South Africa, the supraantennal swelling is about 1.5 diameter of the antennal socket long, abruptly sloping down dorsad, and impunctate. In the female, the punctures of the pygidial plate average about one diameter apart or less, and the femora and tibiae are reddish or the femora are red basally. In the male, the femora are red or black only basally.

GEOGRAPHIC DISTRIBUTION (Fig. 57).— Tanzania to South Africa.

RECORDS.— **SOUTH AFRICA**: **Mpumalanga**: Skukuza in Kruger National Park (3 ♂, PPRI). **Northern Province**: D'Nyala Nature Reserve (2 ♂), Doorndraai Dam Nature Reserve at 24°18′S 28°44′E (1 ♂), Guernsey Farm 15 km E Klaserie (2 ♂, PMA), Mogol Nature Reserve (1 ♂), 20 km N Naboomspruit (1 ♂, SDNHM), Pafuri in Kruger National Park (2 ♀, PPRI). **North-West Province**: 5 km S Brits (1 ♀, OÖLM). **TANZANIA**: **Morogoro Region**: 62 road km SW Morogoro (1 ♂). **ZIMBABWE**: Bulawayo (4 ♀, 6 ♂, SAM, including holotype of *bituberculatus* and ♂ improperly designated by G. Arnold as type), Bulawayo: Umguza River (1 ♂), Iwaba near Kwekwe (1 ♀, BMNH), Kami River 7 km W Nyamandhlovu (1 ♂), Kami Ruins (1 ♀, SAM, paratype of *bituberculatus*), Leighwoods 52 km SW Bulawayo (1 ♂), Mavuradonha Wilderness area 15 km E Muzarabani (1 ♂, OÖLM), Nyagui River 25 km NE Shamva (1 ♂, OÖLM), Redbank at Kami River (2 ♀, 9 ♂; 3 ♂, NHMZ), Sanyati Valley (2 ♂, SAM), Sawmills (1 ♂, SAM).

Tachysphex bostryx Pulawski, sp. nov.

Figures 60, 61.

DERIVATION OF NAME.— *Bostryx*, Greek for curly; with reference to the sinuous genal and propodeal setae of this species.

RECOGNITION.— *Tachysphex bostryx* has the labrum markedly convex and protruding beyond the clypeal free margin, propodeal side not ridged, setae sinuous on the lower gena (also many setae on the propodeal dorsum), no longer than one midocellar diameter on the postocellar area. *Tachysphex micans* and *pulcher* are similar, but in *bostryx* the propodeal side is asetose anteriorly, the setae do not conceal integument on the mesopleuron and hindfemoral outer surfaces, the inner hindtibial spur is the usual shape (i.e., with fine, closely spaced rays), the apical depression of female tergum V is asetose, and the outer dorsal margin of female foretarsomere IV is about 0.7 of the inner margin. In the other two species, the propodeal side is setose throughout, the setae conceal the integument on the mesopleuron (at least in fresh specimens) and the hindfemoral outer sur-

face (at least apicoventrally), the inner hindtibial spur (except many *pulcher*) has stout, widely spaced rays at least near midlength, female tergum V is setose throughout, and the lateral margins of female foretarsomere IV are about equal in length. Also, *bostryx* is geographically isolated from the other two: it is known from southern Ethiopia, Somalia, Kenya, and Tanzania, whereas *micans* ranges from Morocco to Mongolia, south to Mali and Arabian Peninsula, and *pulcher* occurs in southwestern Asia (Turkey to Yemen, east to Kazakhstan and Tajikistan).

Description.— Labrum markedly convex, protruding from beneath clypeus. Galea evenly micropunctate (punctures about one diameter apart), as long as 0.9 of scape in female, as 1.0 in male. Scutal punctures ill defined, about one diameter apart; interspaces microsculptured. Mesopleuron uniformly microsculptured. Propodeal dorsum and side uniformly microareolate. Hindcoxal dorsum with inner margin not carinate. Apical spines of hindtarsomere IV reaching claw bases in female.

Setae not concealing integument; sinuous along occipital and hypostomal carinae, on scutum adjacent to pronotal lobe, on preepisternal area anteriorly, and on propodeal dorsum and posterior face; nearly appressed on postocellar area (no longer than midocellar diameter), appressed on scutal disk; setal length, on each side of oral fossa next to occipital carina, up to 0.6 of basal mandibular width; variously oriented on propodeal dorsum; propodeal side glabrous anteriorly.

Head and thorax black, but mandible (except apex), clypeal bevel, labrum, and scapal venter yellowish red. Frontal and clypeal setae silvery in female, golden in male. Wing membrane hyaline; costal and subcostal veins of forewing light brown. Femora, tibiae, and tarsi red, midfemoral dor-

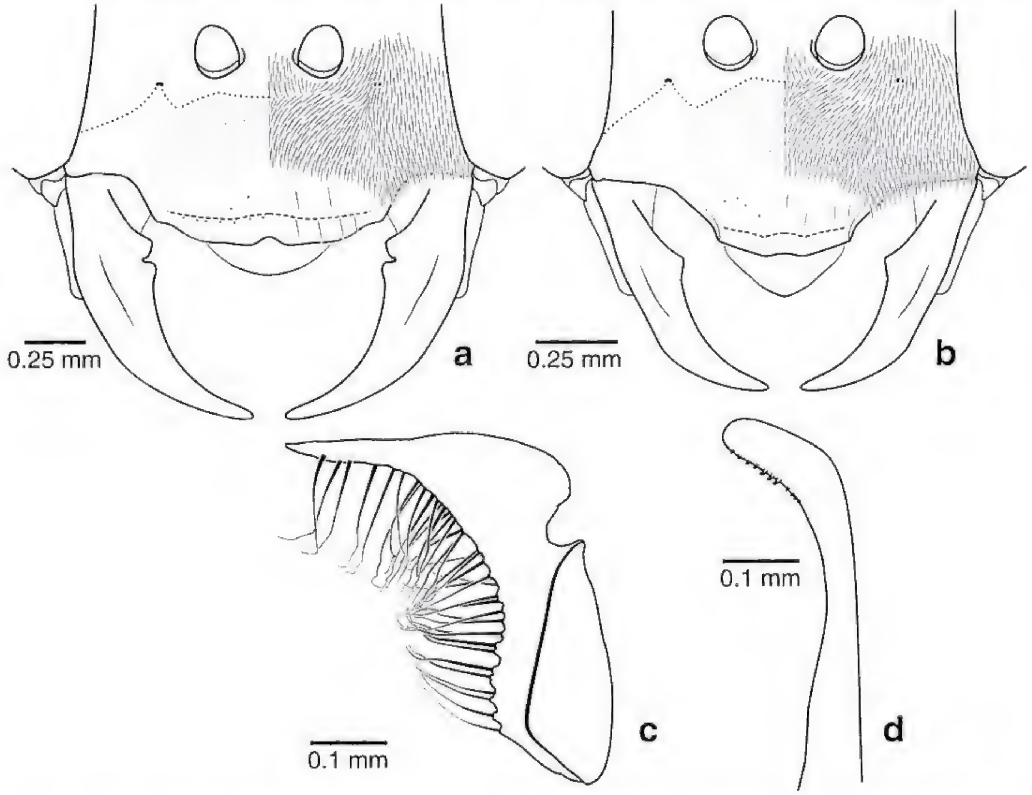

Figure 60. *Tachysphex bostryx* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

sum black basally (also forefemoral dorsum in most specimens). Female gaster either all red or terga III–V black basally or with a pair of black, adlateral spots, male gaster varying from all red to all black (except segment VII reddish and apical depressions of segments translucent); in many males terga I and VII red, terga II–VI partly red and partly black. Terga I–IV silvery fasciate apically (male tergum V with inconspicuous, broadly interrupted fascia).

♀.— Clypeus (Fig. 60a): bevel slightly shorter than basomedian area; lip free margin arcuate, emarginate mesally, minimally concave laterally. Width of postocellar area 0.4–0.5 × length. Dorsal length of flagellomere I 2.8 × apical width. Dorsal foretibial surface with three spines, outer surface with two or three spines. Forebasitarsus with eight or nine rake spines. Outer dorsal margin of foretarsomere IV about 0.7 length of inner margin. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with punctures that are many diameters apart, interspaces aciculate or unsculptured. Length 9.5–11.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 60b): bevel about as long as basomedian area; lip free margin emarginate mesally, with ill-defined corner; distance between corners 1.2 × distance between corner and orbit. Width of postocellar area 0.4–0.6 × length. Dorsal length of flagellomere I 2.0–2.25 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 3–6 preapical rake spines; outer apical spine of foretarsomere II markedly longer than tarsomere III. Sternum VIII evenly emarginate apically, margin almost straight between prongs. Length 6.0–9.7 mm. Volsella and penis valve: Figs. 60c, d.

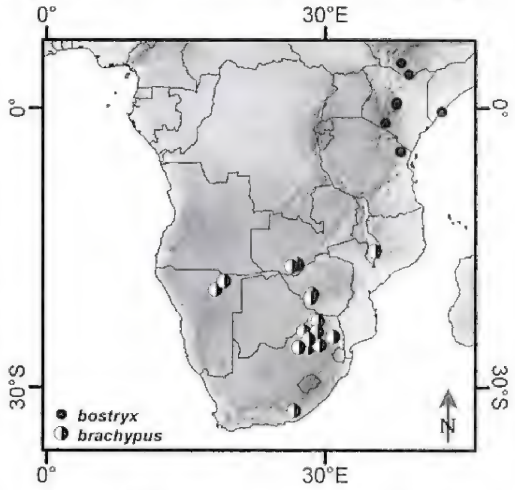

FIGURE 61. Collecting localities of *Tachysphex bostryx* and *brachypus*.

GEOGRAPHIC DISTRIBUTION (Fig. 61).— Southern Ethiopia and Somalia to Tanzania.

RECORDS.— HOLOTYPE: ♀, **ETHIOPIA**: **Sidamo**: 63 km S Yabelo at 4°22′N 38°17′E, 16 Aug 1997, Veronica Ahrens, WJP, Emiru Seyoum (CAS). PARATYPES: **ETHIOPIA**: **Sidamo**: 13 km N Moyale, 10 Aug 1997, Veronica Ahrens, WJP, Emiru Seyoum (1 ♂); same data as holotype (2 ♀, 22 ♂). **KENYA**: **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post, 2–8 Dec 2002, WJP (1 ♂); 5 km NNE Isiolo, 8–10 June 2000, M.H. Bourbin, V.F. Lee, and WJP (4 ♀, 1 ♂). **Rift Valley Province**: Archer's Gate to Samburu National Reserve, 19 June 1999, WJP and J.S. Schweikert (5 ♂); Magadi road 46 air km SW Nairobi, 17 June and 18 July 1999, WJP and J.S. Schweikert (2 ♂); same locality, 29 Nov 2002, WJP (1 ♂); Olorgesailie, 19 July 1999, WJP and J.S. Schweikert (2 ♂). **SOMALIA**: Kismaayo at 0°22′S 42°32′E, 24 Feb 1980, collector unknown (1 ♂, BMNH). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe, Omary S. Haji and WJP, 11–12 July 2001 (2 ♂), 14–15 July 2001 (2 ♂; 1 ♂, BMNH), 18 July 2001 (2 ♂), and 19–20 July 2001 (3 ♂); same locality, 26 Dec 2002 and 15 Jan 2003, WJP (2 ♂); same locality, 15 Jan 2002, M.A. Prentice (4 ♂); 2 km NE Mkomazi, 29–31 Dec 2002, WJP (1 ♂) and 13 Jan 2003, M.A. Prentice (1 ♂); Pangani River Camp 86 km NW Korogwe, 15 Jan 2003, WJP (1 ♀).

Tachysphex brachypus Pulawski, sp. nov.

Figure 61.

DERIVATION OF NAME.— *Brachypus*, Greek for short-legged, with reference to the shortened tarsi of this species.

Recognition.— The female of *brachypus* is similar to *barkeri*. See that species (p. 142) for recognition characters.

The male shares with *barkeri* an unusually short flagellomere I (ventral length slightly less than apical width); a moderately elongate flagellomere II (dorsal length about 1.2 × that of flagellomere I); galea longer than wide in profile (at least slightly so), with lateral surface concave in most specimens; and a slightly shortened midtarsus (length of tarsomere II 1.7–2.0 × apical width, that of tarsomere III 1.2–1.4 × apical width). In *brachypus*, however, the propodeal side is punctate but not ridged (at least slightly ridged in *barkeri*). The antennal and tarsal proportions are also similar in *eurystoma* in which, however, the galea is shorter than long in profile, the clypeal lobe is broader (distance between lip corner 1.3 × clypeal midlength, while about equal to midlength in *brachypus*), and the forebasitarsus has two or three preapical rake spines (no preapical spines or one such spine in *brachypus*).

Status of the species.— *Tachysphex brachypus* differs only minimally from *barkeri* and could be regarded as an individual variant of the latter. I treat them as separate species because I could not document intergradation in their morphological characters.

Description.— Galea shiny, with minute, evanescent punctures, about as long as 0.7 of scape in small specimens (those from Zambia and Zimbabwe) to about 0.9 of scape in others. Labrum obtusely pointed mesally (as in *barkeri*, see Fig. 54c), not or barely exposed. Scutal punctures averaging about one diameter apart (several discal punctures up to 2–3 diameters apart in female). Mesopleural punctures fine, averaging about 2–3 diameters apart near center in female and one diameter in male; interspaces microsculptured, dull. Propodeal dorsum evenly microareolate, side finely punctate (punctures evanescent in some specimens). Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area (setal length about one midocellar diameter); erect on each side of oral fossa next to occipital carina, about 0.2 × basal mandibular width; practically appressed on scutum; markedly shorter than midocellar diameter on midfemoral venter; oriented posterad on propodeal dorsum.

Head, thorax, gaster, and legs black except mandible dark reddish near midlength and tarsal apex red in some specimens. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal vein brown, subcostal vein dark brown. Terga I–III silvery fasciate apically, also tergum IV in specimens from Zambia.

♀.— Clypeus: bevel ill defined but shorter than basomedian area; lip sinuate, with two lateral incisions on each side. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.4 × apical width. Forefemoral venter uniformly, minutely punctate. Dorsal foretibial surface with at most one fine bristle, outer surface with two bristles. Ventral midfemoral margin evenly convex except contrastingly concave preapically (as in Fig. 327c). Tarsi short: length of fore- and midtarsomeres II about 1.1 and 1.6 × apical width, respectively; that of midtarsomere III equal to apical width; that of fore-, mid-, and hindtarsomeres IV about 1.0, 0.9, and 0.9 × apical width, respectively. Forebasitarsus: apical margin with characteristic angulate emargination (see Fig. 54d); outer margin with 8–10 rake spines (that are compressed dorsoventrally); only two or three apical spines with contiguous sockets; length of apical spines about equal to basitarsus width. Apical tarsomeres stout; venter with preapical group of minute spines; apicoventral margin slightly convex; lateral margins each with 1–3 small spines near midlength. Apical depression of tergum V punctate and setose. Pygidial plate emarginate apically, surface with many large punctures intermixed with small ones; many punctures less than one diameter apart (as in Fig. 54e). Length 8.0–10.6 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus: bevel ill defined or absent; lip free margin arcuate, with well-defined corner; distance between corners 1.0–1.1 × distance between

corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I about 1.2 × apical width, ventral length less than apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines (most specimens) or with one such spine near basitarsus midlength; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomere II 1.7–2.0 × apical width, that of midtarsomere III 1.2–1.4 × apical width. Venters of tarsomeres V each with one minute, preapical spine. Sternum VIII: apical margin tridentate. Length 7.0–8.2 mm. Volsella and penis valve as in *barkeri* (see Figs. 55e, f).

GEOGRAPHIC DISTRIBUTION (Fig. 61).— Northern Namibia, Zambia, and Malawi to northeastern South Africa.

RECORDS.— HOLOTYPE: ♀, **ZAMBIA**: 7 km SW Kalomo, 8–9 Mar 1995, WJP (CAS). PARATYPES: **MALAWI**: Mlunguzi E Zomba, 10 Mar 1975, G.G.M. Schulten (1 ♀, ZMAN). **NAMIBIA**: **Grootfontein District**: 10 km NE Grootfontein, 27–31 Mar 1997, M. and O. Niehuis (2 ♂; 2 ♂, OHL). **Rundu District**: 100 km SW Rundu, 1 Feb 1993, J. Gusenleitner (1 ♀). **SOUTH AFRICA**: **Eastern Cape Province**: Katberg, 1–10 Feb 1933, R.E. Turner (1 ♂, BMNH). **Gauteng**: Pretoria, no date, J. Brincker (1 ♀, BMNH). **Mpumalanga**: O.T.K. [= Oostelike Transvaalse Koöperasie] Nature Reserve near Loskop Dam, 9–11 Dec 1985, CDE (1 ♂; 1 ♂, PPRI). **Northern Province**: 14–29 km W Alldays at 22°44′S 28°57′E, 14 Mar 1990, CDE (1 ♀, PPRI); Langjan Nature Reserve, 10 Mar 1990, CDE (1 ♂, PPRI); Mogol Nature Reserve, 27–29 Feb 1984, CDE (2 ♂; 2 ♂, PPRI); Percy Fyfe Nature Reserve at 24°03′S 29°09′E, 10–12 Mar 1980, C. Kok (1 ♂, PPRI); Swadini in Blydepoort Nature Reserve at 24°32′S 30°54′E, 26–29 Jan 1987, B. Grobbelaar (1 ♂, PPRI); 5 mi W Warmbad, 24–25 Feb 1968, K.V. Krombein and P.J. Spangler (1 ♀; 1 ♀, 1 ♂, USNM). **North-West Province**: Rustenburg Nature Reserve, 22–23 Feb 1982, W.W. Mansell (2 ♀; 2 ♀, PPRI); same locality, 23–26 Feb 1981, CDE (2 ♂, PPRI); same locality, 17–20 Mar 1980, CDE, W.A. Harrop and C.G. Moolman (2 ♂; 1 ♀, 3 ♂, PPRI). **ZAMBIA**: **Southern Province**: 5 km E Choma, 11 Mar 1995, WJP (2 ♂). **ZIMBABWE**: Bulawayo airport, 29 Jan 1995, WJP (1 ♀); Matobo, 30 Jan 1998, Ma. Halada (1 ♂, OÖLM).

Tachysphex braunsi Arnold

Figures 62, 63.

Tachysphex braunsi Arnold, 1923:150, ♀, ♂ (as *Braunsi*, incorrect original capitalization). Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (SAM), **here designated**, examined.— Arnold, 1924:64 (color variation; previous record of twig nesting was in error), 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

LECTOTYPE SELECTION.— Arnold (1923) spoke of a single type (without reference to sex) in the original description of *braunsi*, but he designated a female and a male as types. I have selected the female as the lectotype.

RECOGNITION.— The following significant features are shared by both sexes of *braunsi*: labrum mostly flat (minimally convex at the very apex), propodeal dorsum evenly microareolate, propodeal side microsculptured and finely punctate, setae nearly appressed on the postocellar area and scutum and slightly inclined posterad on the propodeal dorsum.

In addition to the above, the female of *braunsi* is characterized by the unsculptured, shiny fore- and midfemoral venters (except for a few large punctures), red tibiae (at least partly), and slightly shortened tarsi (length of midtarsomere II 2.2 × apical width). *Tachysphex rufopictus* is similar, but *braunsi* has unusually short flagellomere VIII (length 1.2 × width), the clypeal lip minimally pointed mesally and with two lateral incisions (one may be ill defined) on each side (Fig. 62a), and an all black gaster. In *rufopictus*, the length of flagellomere VIII is 1.5 × width, the clypeal lip is unusually narrow, evenly arcuate, not incised laterally (Fig. 323a), and the gaster is red basally.

The male has a distinctive clypeus, with an elongate middle section and a roundly pointed lip but no corner (Fig. 62b). In addition, the foretarsus has no rake, apical fasciae on terga I–III are

inconspicuous, setae of sterna III–VI are appressed, about as long as those at the base of sternum II, and, in most specimens, the midfemur is impunctate or sparsely punctate posteroventrally. *Tachysphex rufopictus* is similar, but in *braunsi* the gaster is all black (rather than red basally), and punctures of sterna IV–VI are inconspicuously larger and sparser than those of sternum II (markedly larger and sparser in *rufopictus*). The male of *waltoni* also has a similar clypeus, but the midfemur is finely, uniformly punctured, many setae of the propodeal dorsum are inclined anterad (including those near the propodeal foremargin), terga I–III are silvery fasciate apically (fasciae well defined), and setae of sterna III–VI are subappressed, markedly longer than those on sternum II basally.

Description.— Labrum flat except slightly convex near free margin. Galea longer than wide in profile, its length equal to 0.8 of scape. Scutal punctures small but well defined, averaging about two diameters apart on disk in female, about one diameter apart in male. Mesopleural punctures minute, averaging several to many diameters apart at center in female and 2–3 diameters in male; interspaces microsculptured but shiny. Propodeal dorsum evenly microareolate, side microsculptured and finely punctate (impunctate in some males). Hindcoxal dorsum with inner margin carinate and somewhat expanded basally. Sternum I, in female, with short longitudinal carina apicomesally.

Setae erect on each side of oral fossa next to occipital carina (setal length about 0.2 × basal mandibular width); nearly appressed on postocellar area and scutum; oriented posterad on propodeal dorsum.

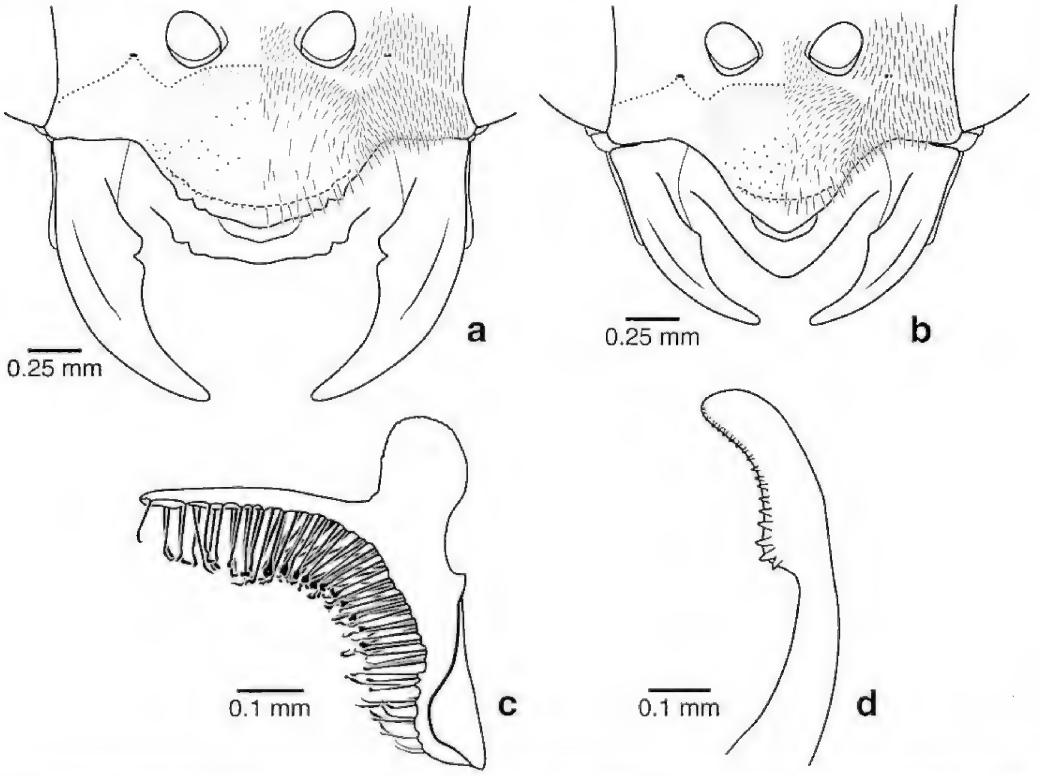

Figure 62. *Tachysphex braunsi* Arnold: a – female clypeus and mandible; b – male clypeus and mandible with outline showing variation of clypeal free margin; c – volsella; d – penis valve.

Head and thorax black, mandible red mesally. Frontal setae silvery in both sexes except golden dorsally in some males. Wing membrane markedly infumate, slightly so in small males; forewing costal vein light brown, subcostal vein brown. Femora in female varying from largely red (forefemur only apically so) to all black, in male black except red apically. Tibiae and tarsi red to largely black. Gaster black. Terga I–III each with inconspicuous, silvery fascia apically.

♀.— Clypeus (Fig. 62a): lobe narrower than in most other species (distance between corners 1.2 × distance between corner and corresponding orbit); bevel longer than basomedian area; lip mainly arcuate but sinuate in some specimens, longer mesally than laterally, with two lateral incisions on each side (one of which may be ill defined). Width of postocellar area 1.2 × length. Dorsal length of flagellomere I 1.6 × apical width; flagellomeres III–VIII with sensory areas; length of flagellomere VIII 1.2 × width. Fore- and midfemoral venters with a few, sparse punctures, interspaces unsculptured, shiny. Dorsal foretibial surface with one or two spines, outer surface with several thin spines, interspaces with sparse micropunctures. Tarsi slightly shortened: length of fore-, mid-, and hindtarsomeres II 1.5, 2.2, and 2.2 × respective apical width; that of midtarsomere III 1.3–1.4 × apical width; of tarsomeres IV about equal to apical width. Forebasitarsus with 10 or 11 rake spines. Apical tarsomeres: apicoventral margin slightly arcuate. Apical depression of tergum V unsculptured, glabrous. Pygidial plate sparsely punctate. Length 9.8–10.8 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft (Fig. 62b). Clypeus (Fig. 62b): middle section conspicuously long; bevel ill defined; lip free margin obtusely pointed mesally (markedly longer mesally than laterally), not angulate laterally, forming single curved line with rest of clypeal margin. Width of postocellar area 1.2 × length. Dorsal length of flagellomere I 1.2–1.4 × apical width, equal to 0.7 of II. Forefemur minutely, densely punctate throughout or posteroventral surface with large, sparse punctures in apical half; notch microscopically setose. Midfemur, in most specimens, impunctate or sparsely punctate posteroventrally, but densely punctate throughout in one of four males from Touwsrivier area. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length 7.0–9.0 mm. Volsella and penis valve: Figs. 62c, d.

Geographic distribution (Fig. 63).— Eastern Cape, Northern Cape, and Western Cape provinces of South Africa.

Records.— SOUTH AFRICA: Eastern Cape Province: Algoa Bay (Arnold, 1924), Elandsheuwels Farm 40 km W Steytlerville (1 ♂, USU), Fullarton E Willowmore (1 ♀, 1 ♂; 1 ♀, AMG), Olifantsrivier 30 km NNE Uniondale at 33°27′S 23°19′E (4 ♂), 6 km N Steytlerville (1 ♂, USU), Willowmore (1 ♂, AMG; 2 ♀, 3 ♂, SAM, including lectotype ♀, paralectotype ♂, and paratype ♂ of *braunsi*; 2 ♀, 10 ♂, TMP), 43 km NE Willowmore: Plessierivier (1 ♂, USU), 37 km NW Willowmore in Grootrivierberg Range (1 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (2 ♀, 4 ♂, USU), 30 km S Steytlerville (1 ♀). **Northern Cape Province**: Dassiefontein Farm near Kamieskroon (1 ♂; 1 ♂, PPRI), 13 mi S Garies (1 ♀), Soebatsfontein at 30°06′S 17°34′E (1 ♀, 1 ♂, OHL), Springbok (1 ♀, AMG), Tanqua-Karoo National Park (3 ♂, SAM). **Western Cape Province**: 48 mi E Barrydale (2 ♂, KU), 50 km N Cape Town (1 ♀, OÖLM), 40 km E Clanwilliam: Sevilla (2 ♀, USU), Katbakkies Pass near Ceres at 33°49′S 19°31′E (1 ♀; 3 ♀, PPRI), Matjiesfontein (1 ♀,

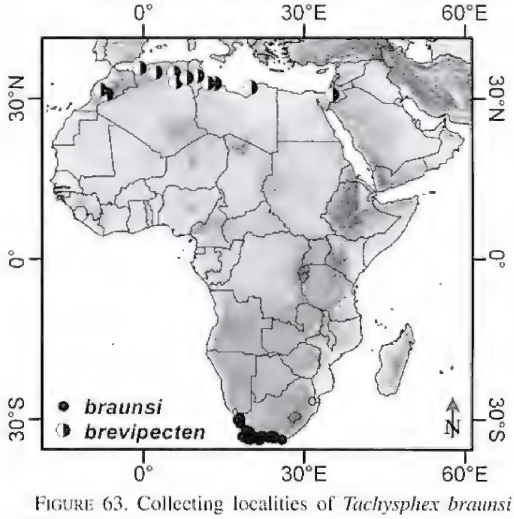

Figure 63. Collecting localities of *Tachysphex braunsi* and *brevipecten*.

1 ♂, SAM), Matroosberg (1 ♂, SAM), 1 km SE Prince Albert at 33°15′S 22°02′E (1 ♂), Swartrivier 7 km NW Prince Albert (2 ♀, 10 ♂), Tierberg Farm 23 km NE Prince Albert (3 ♀, 1 ♂), 18 mi SE Touwsrivier (1 ♀, 2 ♂ AMNH; 4 ♂, KU).

Tachysphex brevipecten de Beaumont

Figures 63, 64.

Tachysphex brevipecten de Beaumont, 1955:177, ♀, ♂. Holotype: ♀, Morocco: Marrakech: Oued Tensift (LAUSANNE), examined before 1971.— de Beaumont, 1956a:197 (Libya), 1960b:238 (Libya); Pulawski, 1971:336 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:272 (listed); Dollfuss, 1989:13 (paratype in NHMW); Guichard, 1991:339 (Jordan).

Recognition.— *Tachysphex brevipecten* is one of many species in which the labrum is conspicuously convex and protruding from beneath the clypeus, and the galea is conspicuously longer than wide.

As its name suggests, the female has an unusually short apical rake spine on the forebasitarsus: its length is about equal in length to foretarsomere II (Fig. 64c), whereas it is markedly longer in the other *Tachysphex* with a convex labrum. In addition, the galea of *brevipecten* has only a few, sparse, ill-defined punctures, foretarsomere II is slightly elongate (length abut 2.2 × apical width, similar as in *excavatus*), and the apical depression of tergum V is impunctate, glabrous.

The male is characterized by a short foretarsal rake (apical spine of foretarsomere II markedly shorter than foretarsomere III) and an apically rounded dorsal volsellar process (Fig. 64d). Unlike other such species, the galea of *brevipecten* is sparsely punctate (punctures ill defined, many diameters apart). In addition, the middle clypeal section is about as long as wide in *brevipecten* (distance between corners about equal to midlength), whereas markedly broader in *sahelensis* (see the latter species for further differences).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea elongate, equal to 1.1–1.4 of scape, microsculptured, with ill-defined punctures that are many diameters apart. Scutal punctures minute, somewhat inconspicuous, no more than one diameter apart. Mesopleuron uniformly microsculptured. Propodeal dorsum evenly microareolate; side uniformly microsculptured. Hindcoxal dorsum carinate basally.

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina, shorter than midocellar diameter; on propodeal dorsum next to midline oriented anterad near base, oriented evenly posterad in apical third or so. Propodeal side all setose (setae inconspicuous anteriorly).

Head and thorax black, mandible reddish mesally; all clypeus, pronotal lobe, and thoracic venter red in one female from Marrakech, Morocco (de Beaumont, 1955). Frontal setae with golden tinge in female, golden in male. Wing membrane slightly infumate; costal vein of forewing reddish, subcostal vein brown. Femora black except red apically in many specimens, all or largely red in some Moroccan females; tibiae and tarsi red (tibiae somewhat darkened in certain females, largely so in male from Oran, Algeria, studied by de Beaumont, 1955). Gaster varying from all red (female from Marrakech) to all black except for some reddish on basal terga (male from Oran), in most specimens red basally and black apically. Terga I–III silvery fasciate apically, but fasciae inconspicuous in males from Touggourt, Algeria, and Skhira, Tunisia.

♀.— Clypeus (Fig. 64a): bevel shorter to longer than basomedian area; lip free margin arcuate, emarginate mesally, incised or not incised laterally. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.3–2.5 × apical width. Dorsal foretibial surface with two or three spines, outer surface with two spines. Forebasitarsus with five or six rake spines (only two apical spines have sockets contiguous), apical spine about equal in length to foretarsomere II (Fig. 64c);

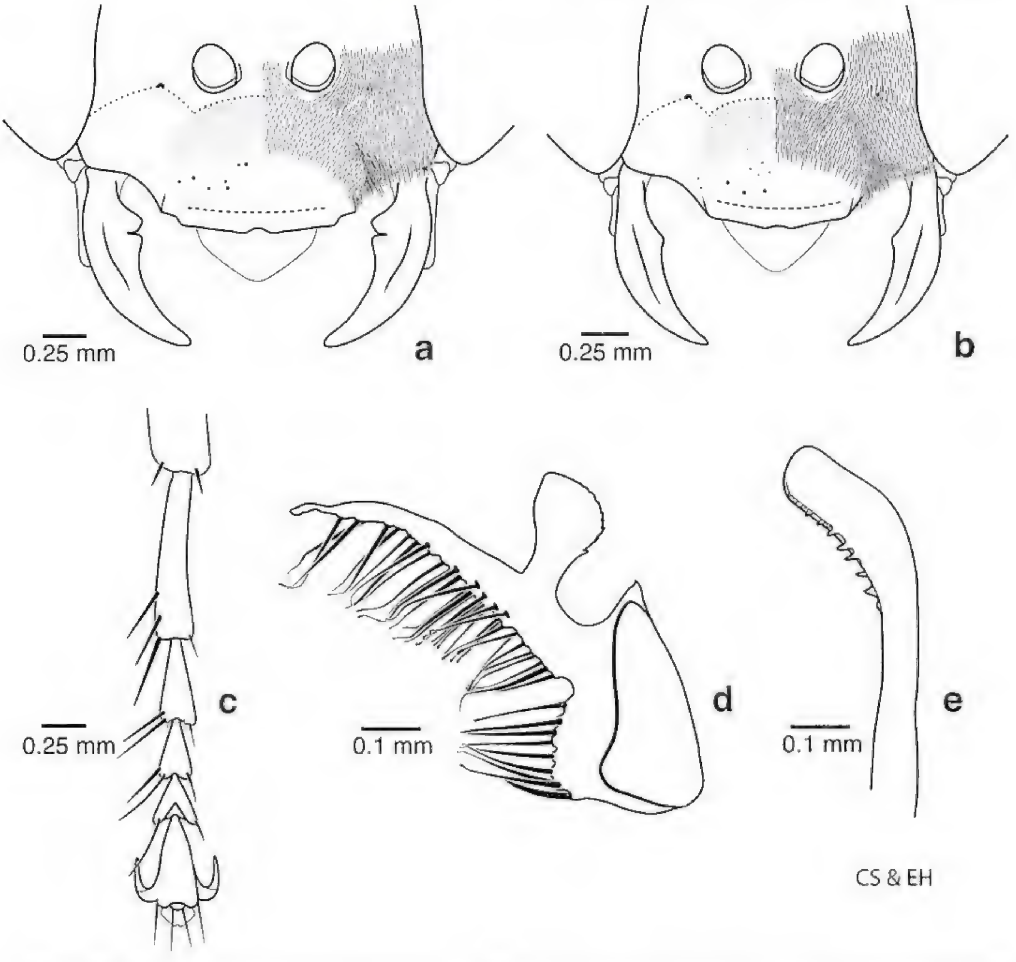

FIGURE 64. *Tachysphex brevipecten* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – female foretarsus; d – volsella; e – penis valve.

foretarsomere II slightly elongate (length 2.2 × maximum width). Apical depression of tergum V impunctate, glabrous. Pygidial plate with minute punctures that are many diameters apart, interspaces unsculptured in basal half or more, somewhat microsculptured near apex. Length 9.5–12.5 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Fig. 64b): bevel nearly as long as basomedian area, delimited anterolaterally by obtuse carina that emerges from lip corner; lip free margin arcuate, mostly emarginate mesally, with well-defined corner; distance between corners 1.2–1.4 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.9–2.1 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with four rake spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length 6.0–10.2 mm. Volsella and penis valve: Figs. 64d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 63).— Morocco to Libya and Jordan (specimens from Istria Peninsula, Croatia, mentioned in the original description, were actually mislabeled, as clarified by Pulawski, 1971).

Records (from de Beaumont, 1955, or as indicated).— **ALGERIA**: Biskra, Oran, Taguin in Alger Province, Touggourt (1 ♂). **JORDAN**: Fidan 125 km N Aqaba (Guichard, 1991). **LIBYA**: **Cyrenaica**: Bengasi. **Tripolitania**: Tagiura, Zuara (Pulawski, 1971). **MOROCCO**: Draa Valley 10 km SE Ouarzazate (1 ♂, CSE), Marrakech (3 ♀, 3 ♂, including 2 ♀, 3 ♂ paratypes of *brevipecten*). **TUNISIA**: Tozeur, Skhira 50 km N Gabès (1 ♂).

Tachysphex brevipennis Mercet

Figures 65–67.

Tachysphex brevipennis Mercet, 1909:197 (April), ♀, ♂. Syntypes: Spain: Escorial (MNCN), not examined.— Mercet, 1910:165 (listed from Spain); Giner Marí, 1934:133 (Spain), 1943a:138 (in Sphecid Fauna of Spain); de Beaumont, 1947c:671 (redescription); de Andrade, 1949:16 (Portugal); de Beaumont, 1962:26 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Suárez, 1969:31 (Spain); Pulawski, 1971:240 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:276 (listed); Gayubo, 1984a:83 (Spain), 1984b:363 (Portugal), 1986a:32 (Spain); Gayubo and Sanza, 1986:43 (Spain); Gayubo and Tormos, 1986:12 (Spain); Asís and Jiménez, 1988:271 (Spain); Gayubo and Mingo, 1988:77 (Spain); Dollfuss, 1989:13 (type material in NHMW); Gayubo, Asís, and Tormos, 1990a:17 (Spain); Gayubo, García, Torres, and González, 1999:89 (Spain); Gonzáles, Gayubo, and Torres, 1999:334 (Spain); Schmidt and Bitsch *in* Bitsch et al., 2001:239 (in Sphecid Fauna of Western Europe); Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004:108 (Spain); Cruz-Sánchez et al., 2005:220 (Spain).

Tachysphex minutus Nurse, 1909:516 (15 November), ♀, ♂. Lectotype: ♂, India: Gujarat: Deesa (BMNH), designated by Pulawski, 1975:311, reexamined in 1997. **New synonym**.— Pulawski, 1975:311 (diagnostic characters); Bohart and Menke, 1976:275 (listed).

Tachysphex lilliputianus R. Turner, 1917c:198, ♂. Holotype: ♂, India: Bihar: Pusa (BMNH), reexamined in 1997. Synonymized with *Tachysphex minutus* by Pulawski, 1975:311.

Tachysphex fulvicornis R. Turner, 1918b:363, ♀. Holotype: ♀, India: West Bengal: Chapra (BMNH), examined in 1974. **New synonym**.— Bohart and Menke, 1976:273 (listed); Guichard, 1980:227 (Oman); Krombein and Pulawski, 1994:87 (in revision of Sri Lankan *Tachysphex*).

Atelosphex miscophoides Arnold, 1923:178, ♀. Holotype: ♀, South Africa: Eastern Cape Province: Willowmore (SAM), examined. **New synonym**.— Arnold, 1924:72 (description of ♂, South Africa), 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex miscophoides*: Bohart and Menke, 1976:275 (new combination, listed).

Atelosphex lugubris Arnold, 1924:72, ♀. Holotype: ♀, Zimbabwe: Sawmills (SAM), examined. Synonymized with *Tachysphex minutus* by Pulawski *in* Pulawski and Krombein, 1995:85.— Arnold, 1951:157 (Ghana).— As *Tachysphex lugubris*: Bohart and Menke, 1976:274 (new combination, listed).

Tachysphex imperfectus de Beaumont, 1940:178, ♀. Syntypes: Egypt: Cairo area: Kerdasa (A. Alfieri collection) and Gebel Asfar (originally A. Mochi collection, now ?, not in MSNT), not examined; de Beaumont (1947a:210) improperly designated holotype from non-type material (♀, Algeria, Biskra, OXUM). Synonymized with *Tachysphex fulvicornis* by Pulawski, 1975:312.— de Beaumont, 1947a:210 (in revision of Egyptian *Tachysphex*); Balthasar, 1954:269 (Palestine); de Beaumont, 1955:187 (Morocco), 1960b:241 (Libya); Pulawski, 1971:248 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:9 (Israel).

Tachysphex rugosus Gussakovskij, 1952:245, ♀, ♂. Lectotype: ♂, Tajikistan: Mikoyanabad, now Kabadian (ZIN), designated by Pulawski, 1971:244, examined before 1971. Synonymized with *Tachysphex minutus* by Pulawski *in* Pulawski and Krombein, 1995:85.— Pulawski, 1971:243 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:9 (Israel); Pulawski, 1974b:715 (Bulgaria, prey); Bohart and Menke, 1976:276 (listed); Kazenas, 1978:111, 124 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:214 (in key to Sphecidae of European USSR); Shkuratov, 2000:58 (Russia: Rostov Oblast'); Kazenas, 2001:30 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002:74 (Kazakhstan).

Tachysphex heterochromus de Beaumont, 1955:187, ♀, ♂. Holotype: ♀, Morocco: Port Lyautey, now Kenitra (LAUSANNE), examined. **New synonym**.— Pulawski, 1971:250 (in revision of Palearctic *Tachysphex*);

Bohart and Menke, 1976:274 (listed).

As *Tachysphex* sp.: Pulawski, 1958:181 (Bulgaria), corrected to *Tachysphex rugosus* by Pulawski, 1971:243.

Tachysphex rhodius de Beaumont, 1960a:19, ♀, ♂. Holotype: ♀, Greece: Island of Rhodes: Kamiros (RMNH), examined. Synonymized with *Tachysphex rugosus* by Pulawski, 1971:243.— de Beaumont, 1965:53 (Greece); Pulawski, 1967:408 (Turkey).

Tachysphex sinaiticus Pulawski, 1964:108, ♀. Holotype: ♀, Egypt: Sinai Peninsula: Feiran oasis (CAS), examined. **New synonym.**— Pulawski, 1971:245 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:9 (Israel); Bohart and Menke, 1976:276 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

As *Tachysphex* aff. *rhodius*: Pulawski, 1967:408, corrected to *Tachysphex rugosus* by Pulawski, 1971:243.

Tachysphex quadrifurci Pulawski, 1971:246, ♀, ♂. Holotype: ♂, Turkmenistan: Askhabad (CAS), examined. Synonymized with *Tachysphex minutus* by Pulawski *in* Pulawski and Krombein, 1995:85.— Bohart and Menke, 1976:276 (listed); Kazenas, 1978:111, 124 (in key to Sphecidae of Kazakhstan and Central Asia); Guichard, 1991:340 (Jordan); Kazenas, 2001:30 (in checklist of Sphecidae of Kazakhstan and Central Asia).

Tachysphex convexus Pulawski, 1971:248, ♀. Holotype: ♀, Turkmenistan: Murgab (ZIN), examined before 1971. **New synonym.**— Bohart and Menke, 1976:273 (listed); Kazenas, 1978:111 (in key to Sphecidae of Kazakhstan and Central Asia), 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002:66 (Kazakhstan).

Recognition.— *Tachysphex brevipennis* is unusual in lacking the episternal sulcus (Fig. 65e), a reduction shared only with *carli* de Beaumont and *sympleuron* Pulawski. All three have the wings shorter than average for *Tachysphex*: the distance between the origin of the subcostal vein and the wing apex is 2.25 × (smallest specimens) to 2.8 × (largest specimens) the scutal width at the front margin of the tegula, while 2.9–3.2 × in the other *Tachysphex*. All three also have a short malar space (Fig. 65c), a feature shared with the unrelated Nearctic species *papago* Pulawski, *psilocerus* Kohl, and *scopaeus* Pulawski. In addition, the metapleural sulcus of most specimens is ill defined to absent between the upper pit and midcoxa. The three species now recognized have the following characteristics:

Tachysphex brevipennis (Africa, southern Europe, east to Kazakhstan and India): the clypeal lip is not incised laterally; the scape is the usual shape, i.e., its venter is concave in the basal half. In addition, the mesopleuron in most populations is not ridged posteriorly, and the male forefemoral notch is glabrous (but unusually small and setose in specimens from Zambia). In the female, the gaster and legs vary from all black to all red in various combinations. In the male, the foretarsal rake varies (mostly geographically) from well developed to absent. The shape of the volsella is distinctive (Fig. 66). Differences between *brevipennis* and *sympleuron* are discussed below under the latter species.

Tachysphex carli de Beaumont, 1947 (central Spain, Gibraltar, northwestern Morocco): the clypeal lip is incised laterally; the scapal venter is not concave (straight in profile); and the mesopleuron is ridged posteriorly. In addition, the female gaster is red basally, and in the male the forefemoral notch is setose and the foretarsus has no rake. The volsella is also distinctive, with an almost flat dorsal margin (see Pulawski, 1971:252).

Tachysphex sympleuron Pulawski, 1995 (India, Sri Lanka). As in *brevipennis*, the clypeal lip has no lateral notch, and the scapal venter is concave in the basal half. The species can be recognized by a combination of yellowish wings, mesopleuron dull and punctatorugose below scrobe, an all black flagellum, male forefemur with a setose notch, and a distinctive volsella (see Krombein and Pulawski 1994:61). Although the West African *brevipennis* have the same mesopleural sculpture and a black flagellum, those from Asia differ from *sympleuron* either in having a punctate mesopleuron (with shiny interspaces) or a basally red female flagellum. In the male of *brevipennis*,

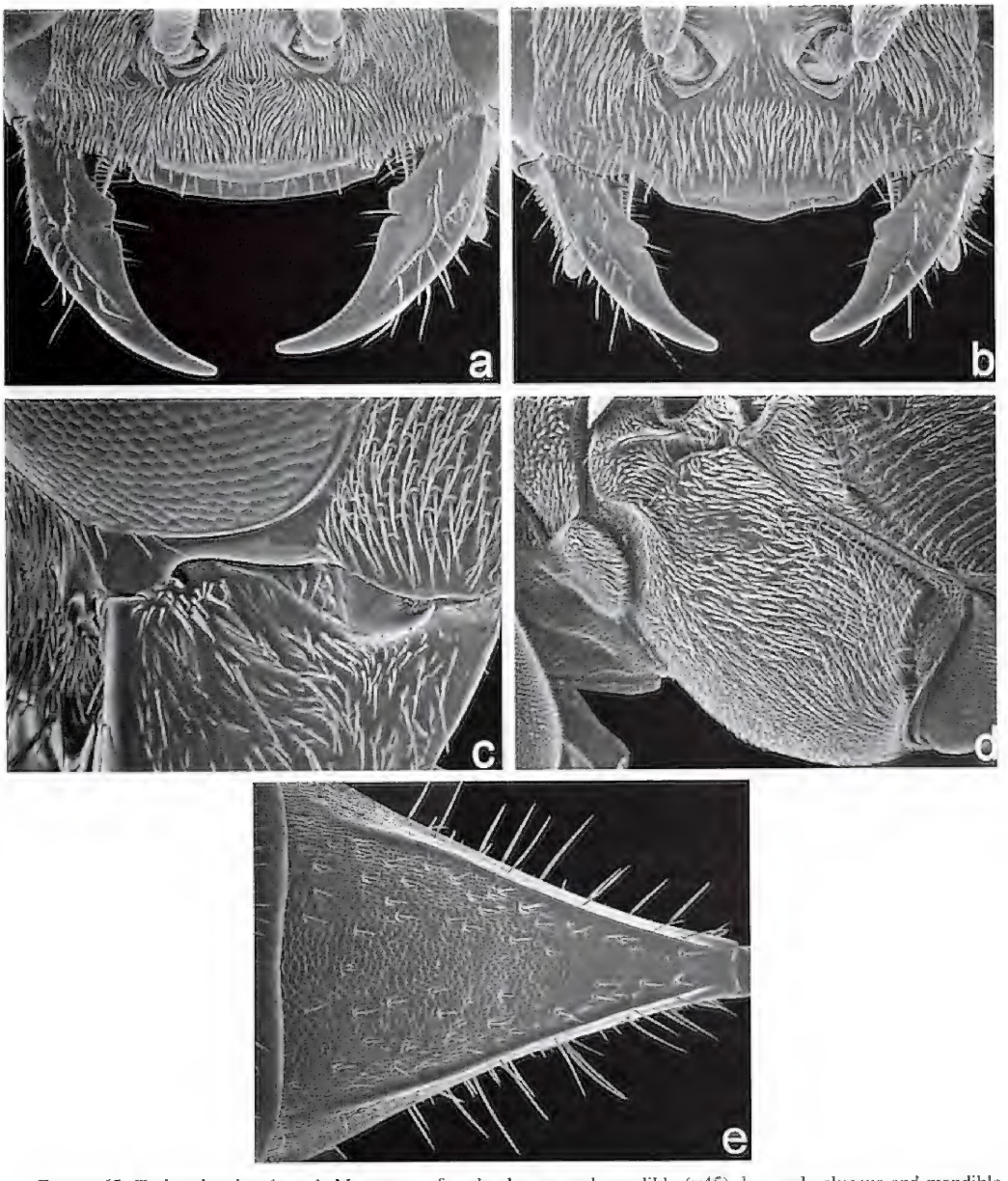

FIGURE 65. *Tachysphex brevipennis* Mercet: a – female clypeus and mandible (×45); b – male clypeus and mandible (×63); c – malar space of female (×168); d – female mesopleuron (×39); e – pygidial plate of female (×82).

the forefemoral notch is glabrous (setose in specimens from Zambia). In India, *sympleuron* and *brevipennis* occur in mixed populations, without intermediates. For example, I collected both in the dry bed of the Banas River near Deesa in 1989.

GENERIC CLASSIFICATION.— Arnold (1923) established a genus, *Atelosphex*, to include these *Tachysphex* that lack the episternal sulcus, but de Beaumont (1940) placed them in his *imperfectus*

species group (renamed *brevipennis* group by Pulawski, 1971). De Beaumont's interpretation has been accepted by all subsequent authors.

JUSTIFICATION OF NEW SYNONYMY.— I combine under *brevipennis* a number of allopatric populations that were previously treated as species. They were separated by differences in color, sculpture, shape of the pronotum, and male foretarsal rake, none of which is constant. As additional material becomes available, these populations appear to blend into each other, and I conclude that they are geographic forms of one polymorphic species. Details are given below and also in the Variation section. I treat *carli* and *sympleuron* as full species because I have not observed intergradation to *brevipennis*. The following six nominal species are newly synonymized with *brevipennis*:

Tachysphex convexus Pulawski, 1971 (described from one female from Kazakhstan and another from Turkmenistan). Similar to other Asian forms except that the female foretibia is sparsely punctate on the outer surface; basal flagellomeres are red; and a black gaster is combined with red legs, a color pattern that is duplicated only in an Algerian female. An additional female from Nishan, Uzbekistan, however, appears intermediate: it has the femora largely black and the sparsely punctate foretibial zone is rudimentary. The foretibial outer surface is somewhat sparse in certain specimens from other areas, e.g., the single female from Central African Republic.

Tachysphex fulvicornis R. Turner, 1918 (North Africa, Mali, Sudan, Arabian Peninsula, Israel, and also one locality in West Bengal, India). Characterized by an all black gaster, excessively dense tergal punctures, punctatorugose frons and mesopleuron, and reddish or brown reddish basal flagellomeres in the female. Identical sculpture of the frons, mesopleuron, and terga, however, is found in specimens from the Ivory Coast and Ghana, in which the female antenna is all black. In specimens from Senegal, the mesopleuron is punctatorugose, but the tergal punctures are less dense than in North African individuals. Also, flagellomeres IV and VI are yellowish brown or reddish ventrally in the single female from Pakistan and another from Suez, Egypt (that I described as *quadrifurci*) but their mesopleuron is punctate and tergal punctures are sparser than in *fulvicornis*. These two individuals are probably intermediates. Basal flagellomeres are also red in certain individuals from Kazakhstan, Uzbekistan, and Turkmenistan (*convexus*), and reddish ventrally in the Moroccan females described as *heterochromus* (see below). Forms assigned to *fulvicornis* and *minutus* are both found in Bat Yam, Israel. The legs are nearly all red in a female of *fulvicornis* from Biskra, Algeria, suggesting full color intergradation to *heterochromus*.

Tachysphex heterochromus de Beaumont, 1955 (known from Kenitra area and Mamora, two adjacent localities on the Atlantic coast of northern Morocco). The pronotal collar is swollen, as in the Iberian specimens; in the female, the mesopleural setae largely conceal the integument, the gaster and all legs are red, and the setae are golden on the frons and thoracic dorsum. The relatively dense mesopleural vestiture seems to be the most significant feature, but a female from Yaffa, Israel, approaches this condition.

Tachysphex minutus Nurse, 1909 (southeastern Europe, southwest Asia, northern India, Africa except North Africa). In these specimens, the pronotal collar is not swollen and does not reach the scutum level, and the male foretarsus has at least two preapical rake spines (in the typical *brevipennis* from the Iberian Peninsula, the pronotal collar is swollen and reaches the scutum level, and the male foretarsus has at most one preapical rake spine). These characters are not constant, however. The pronotal collar is also swollen (as in the Iberian specimens) in one of the two Namibian females, and one Bulgarian female approaches this condition. In a male from Gilbuena, Spain, on the other hand, the collar is as low as usual in non-Iberian populations, and the foretarsomere has two subbasal spines. The gastral base is red in the Iberian females, but it is also red in some specimens from southeastern Europe and Turkey, and in one female from Ain Sefra, Algeria. These populations, therefore, cannot be separated either by structural or chromatic characters.

Tachysphex miscophoides Arnold, 1923 (Karoo Desert, South Africa). Differing from other sub-Saharan specimens only in color: the female gaster is red basally (at least partly so), and the tibiae are either all red or the female fore- and midtibiae are partly darkened. Of the two males from the Karoo Desert that I have examined, one has tergum I partly red, whereas the gaster is all black in the other. This variation and lack of morphological differences suggest full intergradation to other populations.

Tachysphex sinaiticus Pulawski, 1964 (Sinai Peninsula). This species, based on two females from Feiran oasis, was characterized by a glabrous propodeal dorsum (with a few, isolated setae in one specimen). The three males that I collected at Saint Catherine monastery (40 air km away from Feiran oasis) in May 1993 appear to be conspecific, but their propodeal dorsum is setose, as in the other *brevipennis*. Thus, the asetose (or nearly so) propodeal dorsum appears to be an individual or local variation (propodeal vestiture is not likely to be sexually dimorphic). The males from Sinai have a markedly sinuate rather than arcuate clypeal lip, but the same shape is found in a male from Petra, Jordan, and one from Archer's Post, Kenya. The clypeal lip is either arcuate or sinuate in specimens from Sanaa, Yemen.

Description.— Frons punctate or punctatorugose (punctures less than one diameter apart). Malar space present (Fig. 65c), varying in length from about 0.6 to about one midocellar diameter. Basal half of scape concave ventrally. Scutum shiny, punctures averaging from more than one to less than one diameter apart. Mesopleuron punctate to punctatorugose (punctures no more than one diameter apart), interspaces confluent into longitudinal ridges posteriorly in some North African and Senegalese specimens; interspaces shiny to dull. Episternal sulcus absent (Fig. 65d). Metapleural sulcus, below upper metapleural pit, evanescent to absent in most specimens, but well defined in some (e.g., some from Bulgaria and Hungary; and in females from the Ivory Coast, Ghana, and Suez area and Sinai Peninsula, Egypt). Propodeal dorsum varying from all ridged longitudinally to irregularly ridged mesally and rugose laterally; side ridged. Hindcoxal dorsum with inner margin carinate basally, carina low to slightly expanded, absent in some males.

Setae appressed to nearly erect on postocellar area (setal length about one midocellar diameter); appressed or nearly so on scutum; inclined between mandible and occipital carina; and oriented anterad on propodeal dorsum (but oriented posterolaterad near dorsum's lateral margin and oriented posterad near base).

Head and thorax black, mandibles yellowish red mesally; scape translucent apicoventrally, remaining venter black to red. Frontal setae silvery in most specimens (females and males), but golden in females from Kenya and Tanzania. Wing membrane slightly infumate to hyaline, with yellowish tinge in a female from Karachi area, Pakistan, yellowish in specimens from India and Sri Lanka. Legs black in most specimens, but all red in some females, and all tibiae red in some males. Gaster varying from all black to all red. Terga I–III in most females (I–VI in some), I–III to I–IV in males, silvery fasciate apically (terga I–III with conspicuously golden fasciae in most females from Yemen).

♀.— Clypeus (Fig. 65a): bevel shorter than basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 1.5–2.0 × length in most specimens, 3.0 × length in a specimen from Klawer-Clanwilliam area, South Africa. Dorsal length of flagellomere I 2.3–2.7 × apical width. Foretibia densely, uniformly punctate and setose throughout in most specimens, without spines or bristles on dorsum and outer surface (outer surface sparsely punctate in some specimens from Kazakhstan and Turkmenistan). Forebasitarsus with six or seven rake spines. Pygidial plate microscopically reticulate (except apically) and with sparse punctures (Fig. 65e). Length 5.5–10.1 mm.

♂.— Mandible: trimmal carina with tooth, in most specimens also with cleft. Clypeus (Fig. 65b): bevel slightly shorter than basomedian area; lip in most specimens slightly arcuate but markedly sinuate in some, with well-defined corner; distance between corners 1.3–1.4 × distance between corner and orbit. Width of postocellar area 2.0–3.0 × length. Dorsal length of flagellomere I 1.6–2.1 × apical width. Forefemoral notch mostly glabrous, setose in some specimens (see Variation below for details), rudimentary or absent in most Kenyan specimens, absent in a specimen from 73 km N Korogwe, Tanzania. Outer margin of forebasitarsus with 0–4 preapical rake spines (see Variation below), number of spines may be different on each leg; in most cases, at least one spine longer than apical width of basitarsus; outer apical spine of forebasitarsus: see Variation below. Sterna densely, evenly punctate and setose. Length 4.0–6.2 mm. Volsella and penis valve: Fig. 66.

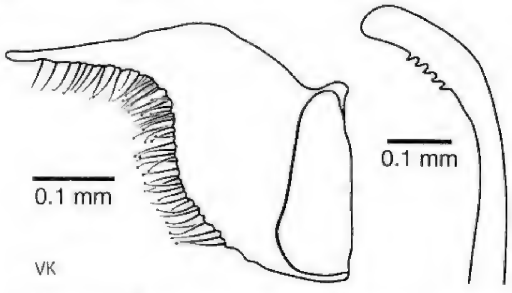

FIGURE 66. *Tachysphex brevipennis* Mercet: volsella and penis valve.

VARIATION.— Gena. The gena is thick in dorsal view in most specimens from the Iberian Peninsula, many from southeastern Europe and Turkey, females from Nefta area, Tunisia, those from Arabian Peninsula (except some from Yemen) and sub-Saharan Africa (except some from Senegal). It is unusually thin in some specimens from Northern Hemisphere deserts (e.g., Suez area, Egypt; Masirah Island, Oman; Wadi el Gaber, Yemen; Askhabad, Turkmenistan) and intermediate or variable in others.

Pronotum. The pronotal collar is slightly more swollen adjacent to scutum than average for the genus in the Iberian specimens and those from the Atlantic coast of Morocco, but some specimens from Namibia are identical, and certain specimens from Bulgaria approach this condition. The collar is barely swollen in the single male from Gilbuena, Spain.

Frons and mesopleuron sculpture. The integument varies from punctate to punctatorugose, with many intermediates. For example, both frons and mesopleuron are punctate in specimens from Kazakhstan, southeastern Europe, Sicily, Iberian Peninsula, the Kasserine area in Tunisia, Atlantic coast of Morocco, Masirah Island, Niger, Ethiopia, several from Mauritania, and one male from Taita Discovery Centre area, Kenya. Both frons and mesopleuron are punctatorugose in most specimens from North Africa, West Africa, and the Arabian Peninsula, but the mesopleuron is just punctate in one female from Mauritania, one from the Toumodi area, Ivory Coast, and the only female from San area, Mali. The frons is punctatorugose and the mesopleuron punctate in specimens from southern Africa, Tanzania, Pakistan, Yemen, and Voi area, Kenya.

Tergal punctation. In most populations, tergal punctures are close to each other. For example, punctures of tergum II are separated by interspaces that are linear or nearly so (interspaces particularly narrow in specimens from Senegal, Ivory Coast, Ghana, Mali, Niger, Tanzania, Arabian Peninsula, and most North African specimens). The interspaces are slightly larger (many of them equal to puncture diameters or slightly more) in specimens from southeastern Europe, Turkey, from Sanaa, Yemen, those from South Africa, the single female from Ain Sokhna, Egypt, and the single male from Kasserine area, Tunisia.

Color of female clypeus. In most specimens, the clypeus is black except for a reddish, linear zone on the bevel adjacent to the lip base. The reddish zone is somewhat expanded in some Iberian, some Egyptian, some Senegalese, and some Omani specimens, two females from Matjiesfontein, South Africa, as well as the single female from Pakistan; and the clypeal middle section is predominantly or entirely reddish in many specimens from Morocco, Algeria, Egypt, Yemen, in the single

female from Agadez Region, Niger, in the single female from Mali, and some females from Kazakhstan, Uzbekistan, and Turkmenistan.

Color of female flagellum. The flagellum is mostly black, but flagellomere I is somewhat reddish ventrally in the single female from Pakistan, and some flagellomeres are yellowish brown ventrally in single female collected west of Suez, Egypt (flagellomeres IV and VI on right antenna, flagellomere III on left antenna). Flagellomeres I–III are brown or red at least ventrally in North African specimens (including those from coastal Morocco), some Senegalese specimens, the single female from Agadez Region, Niger, but all black in single female from Metlaoui area, Tunisia), most females from Niger, the females from the Arabian Peninsula, Mali, and one from St.-Louis, Senegal (in these females, the scape is also reddish, and so is the pedicel in some).

Color of female legs. The legs are black in most specimens, but all red in those from coastal Morocco, one from Biskra, Algeria (de Beaumont 1947), many from South Africa (coxae and femoral dorsum may be black), one from Helmeringhausen area, Namibia, and some from Kazakhstan, Uzbekistan, and Turkmenistan. The black femora are combined with partly red tibiae in the Iberian specimens, one female from Bulgaria, one from Metlaoui area, Tunisia, one from Tafraout, Morocco, one from Ain Sefra, Algeria, two from Mauritania (only hindtibial dorsum basally in the latter three specimens), some from Willowmore, South Africa (tibiae may be all red), and one from the Klawer-Clanwilliam area, South Africa. The female from Agadez Region, Niger, has the posterior face of the fore- and midfemora reddish apically. Tarsi varying from black to red.

Color of female gaster. The female gaster is mostly black, but segments I and II are red in specimens from the Iberian Peninsula and some from Macedonia, Greece, and Turkey; segments I and II and part of III are red in the single female from Ain Sefra, Algeria, as are terga I and II mesally in female from Metlaoui area, Tunisia; and segments I and II or I–III are red in most females from South Africa (segments I and II red only laterally and preapically in two ♀ from Willowmore) and one from Helmeringhausen area, Namibia. Segment VI and sternum V are red in the females from Kenya and some from Tanzania. The gaster is all red (with terga IV and V darkened) in all four known specimens from the Atlantic coast of Morocco (the type series of *heterochromus*).

Male clypeal lip. Evenly arcuate in most specimens, but conspicuously sinuate (i.e., with a rounded, median projection) in all three males examined from Sinai Peninsula, single males from Petra, Jordan, Wadi Gaber, Yemen, and either arcuate or sinuate in males from Archer's Post, Kenya, from Tanzania, and from Sanaa, Yemen.

Male forefemoral notch. Glabrous in most populations, but setose (and unusually small) in specimens from Zambia.

Male forebasitarsus: number of rake spines. The number of preapical spines is two or three in most populations (four in some Egyptian and some Senegalese specimens); when only two are present, they are placed mostly subbasally on the tarsomere. The single male from Dushanbe area, Tajikistan, has two such spines, but one is rudimentary on one leg. There are two spines on one leg (one rudimentary), and one rudimentary spine on the other in the single males from Kasserine area, Tunisia, and Chipata area, Zambia. No preapical spines are found in most Iberian specimens, but some have one, and the single male from Gilbuena has two.

Male foretarsus: length of rake spines. The longest rake spines are found in specimens from Northern Cape Province of South Africa, Pakistan, Sanaa, Yemen, Askhabad (Turkmenistan), and Deesa (India). In several of them, the outer apical spine of foretarsomere II is as long as tarsomere III (but shorter in other males from these areas).

Color of male legs. Legs mostly black, but the tibiae and tarsi are red in most South African specimens (black in single male from Matjiesfontein) and in single male from Kenitra, Morocco; also the femora are red in the single male from Kamieskroon area, South Africa (midfemoral dor-

sum largely black).

Color of male gaster. The gaster is black in most specimens, but tergum I has a red transverse, preapical band in the single male from Kamieskroon area, South Africa.

Prey.— Pulawski (1974b) observed in Bulgaria a female carrying her prey, a young nymph of the grasshopper *Omocestus petraeus* (Brisout).

Geographic distribution (Fig. 67).— Africa, Iberian Peninsula, Sicily, southeastern Europe north to Hungary and Romania, Azerbaijan and Turkey to Israel, Arabian Peninsula, Transcaspia (Uzbekistan, Tajikistan, Turkmenistan), Pakistan, and India.

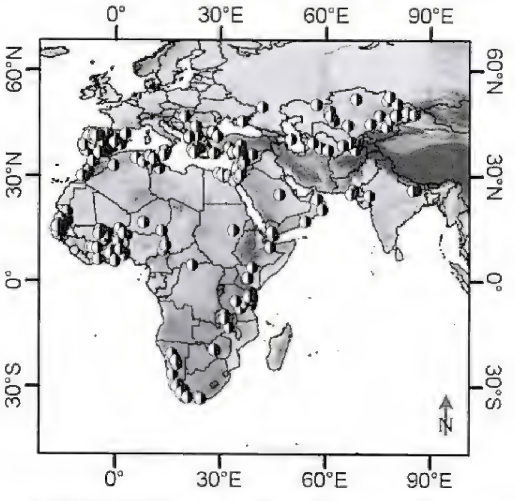

Figure 67. Collecting localities of *Tachysphex brevipennis*.

Records.— **ALGERIA**: Ain Sefra (1 ♀, MNHN), Biskra (de Beaumont, 1947a). **AZERBAIJAN**: Baku area (Pulawski, 1971). **BENIN**: 15 km SE Sabé (1 ♀; 1 ♀, 1 ♂, OÖLM), Zagnanado on River Oumé at 7°16′N 2°21′E (1 ♀, OÖLM). **BULGARIA**: Kiten 35 km SE Burgas (2 ♀), Nessebar (2 ♀), Ropotamo River mouth (1 ♀, 1 ♂), Sandanski (Pulawski, 1971), Sozopol (2 ♀, 8 ♂). **BURKINA FASO**: Boromo (2 ♂, FSAG), 28 km NE Dédougou at 12°35.5′N 3°15.6′W (1 ♂), Kompienga 20 km S Pama (1 ♂, LEM), 4 km NW Ouahigouya at 13°37.0′N 2°27.6′W (1 ♂). **CAMEROON**: **Extrême-Nord**: 40 km S Maroua (1 ♀). **Nord**: 15 km W Campement des Eléphants and 67 km S Garoua (1 ♀, 2 ♂). **CENTRAL AFRICAN REPUBLIC**: Kembe at 4°25′N 21°53′E (1 ♀). **EGYPT**: **Al Buhayrah**: El Bouston District 77 km SW Alexandria (1 ♀, FSCA), Wadi Natrun: Bir Hooker (1 ♂). **Al Fayyum**: Karanis (4 ♂, MSNT), Kom Osheim (1 ♀, 3 ♂). **Al Jizah** (= Ghiza): Ghiza (5 ♀, 3 ♂; 1 ♂, FSCA), Dahshur (1 ♀), Kerdasa (de Beaumont, 1940), Manshiet Radwan (Pulawski, 1971), Saqqara (1 ♂). **Al Qahirah** (= Cairo): Gebel Asfar (de Beaumont, 1940), Maadi (1 ♀, 2 ♂), Katamia area 40 km E Maadi (1 ♂). **As Suways** (= Suez): Suez (de Beaumont, 1947a), 18–25 km W Suez (Pulawski, 1971). **Sina** (= Sinai): oasis Feiran (2 ♀, holotype and paratype of *sinaiticus*), Saint Catherine monastery (3 ♂). **ETHIOPIA**: **Sidamo**: 26 km N Moyale (1 ♀). **GAMBIA**: Fajara (1 ♂, KMG), Keneba (1 ♀, BMNH). **GHANA**: Accra (1 ♀, 5 ♂), Kawampe 45 km N Kintampo at 8°30′N 1°35′W (1 ♀, 1 ♂), 30 km S Kintampo (3 ♂), Legon 12 km NNE Accra (5 ♀). **GREECE**: **Aegean Islands**: Island of Rhodes (de Beaumont, 1960): Ixia, Kamiros. **Pelopónnisos** (de Beaumont, 1965): Kalamata, Olympia, Pyrgos, also Lagonissi (Pulawski, 1971) and Mystro 5 km SW Sparta (1 ♂, PAGLIANO). **HUNGARY**: 15 km SW Kecskemet (1 ♀). **INDIA**: **Bihar**: Pusa (1 ♂, BMNH, holotype of *lilliputianus*). **Gujarat**: Deesa (1 ♀, 5 ♂; 4 ♀, 1 ♂, BMNH, including holotype of *minutus*). **West Bengal**: Chapra (1 ♀, BMNH, holotype of *fulvicornis*). **ISRAEL**: Acco = Acre (Pulawski, 1971), Bat Yam 3 km S Yaffa (2 ♂), Nahariya (Pulawski, 1971), Urim (Pulawski, 1971), Wadi el Kelt (= Qilt) near Jericho (Balthasar, 1954), Yaffa (1 ♀). **ITALY**: **Sicilia**: Gela (1 ♂). **IVORY COAST**: Bouaké: Foro-foro (1 ♂, UCD), 20 km W Boundiali (1 ♀), 56 km N Niakaramandougou (1 ♂), 40 km S Toumodi (8 ♀, 10 ♂; 5 ♀, 4 ♂, MSNT), 50 km S Yamassoukro (1 ♂). **JORDAN**: Aqaba (Guichard, 1991), Petra (1 ♂). **KAZAKHSTAN**: (K = Kazenas, 2002): **Almaty**: 20 km NE Kapchagai (K), mouth of Lepsy River (K). **Aqmola**: 12 km NE Atbasar (K). **Aqtöbe**: 5 km S Aktöbe (K), 30 km SW Irghiz (K). **East Kazakhstan**: 64 km S Aksuat (K), 5 km S and 33 km SSW Ayaguz (1 ♂), 33 km SSW Ayaguz (K), 4 km W Bazarka (K), 5 km NE Karatal (K), 8 km NW Semey (K), 5 km SW village Tansyk which is 47°17′N 79°50′E (2 ♂), 20–25 km NW Tansyk (K). **Pavlodar**: Belogor'ye (K), Shcherbakty (K). **Qarahgandy**: 50 km NE Balqash (K). **Qyzylorda**: 5 km E Akespe = 80 km W Aral'sk at about 47°N 60.5°E (K), 3 km NW Kamyshlybash (K), 15 km S Kazalinsk (K), 14 km SE Saksaul'skiy (K), Tartugai 75 km SE Qyzylorda (1 ♀, paratype of *convexus*). **South Kazakhstan**: 5–8 km SW Chardara (K). **Zhambyl**: 50–70 km NW Furmanovka (K). **KENYA**: **Coast Province**: ca 10 km N Taita Discovery Centre (1 ♀, 1 ♂), Voi (1 ♀,

1 ♂), 2 km S Voi (1 ♂), 14 km SW Voi (1 ♀), Voi area (1 ♂, OÖLM). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (13 ♀, 23 ♂). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (2 ♀, 1 ♂). **LIBYA**: **Tripolitania** (de Beaumont, 1960): Ain el Auenia 15 km W Jefren, Gasr Garabulli 40 km W Homs. **MACEDONIA**: eastern shore of Lake Prespa (Pulawski, 1971). **MALI**: 10 km S Mopti (1 ♀), 40 km W Mopti (1 ♂, MS), 45 km W Mopti (1 ♀, 1 ♂), 5 km S San (1 ♀). **MAURITANIA**: Akjoujt-Treivia at 19°36′N 14°03′W (1 ♀, 1 ♂, PPRI), 25 km NE Aleg (1 ♂, MSNT), 30 km S and 60 km SE Nouakchott (2 ♀). **MOROCCO**: Asni (de Beaumont, 1955), Kenitra (1 ♂), Kenitra: Mehdia (1 ♀, paratype of *heterochromus*), east of Kenitra (1 ♀), Mamora (de Beaumont, 1955, paratypes of *heterochromus*), Tafraout (1 ♀), Tiznit: Oued Massa (1 ♀). **NAMIBIA**: **Karibib District**: 23 km N Karibib (1 ♀). **Lüderitz District**: Aus (1 ♀, BMNH). **Okahandja District**: Okahandja (2 ♂, MS). **Otjiwarongo District**: 3 km NE Kalkfeld (1 ♀). **Rehoboth District**: 15 km N Kalkrand (1 ♂, MS). **Windhoek District**: Aris 25 km S Windhoek (1 ♂). **NIGER**: **Agadez Region**: 30 km S Agadez at 16°39.0′N 7°56.9′E (1 ♂). **Diffa Region**: 2 km ENE Nguigmi at 14°15.2′N 13°08.2′E (1 ♀). **Dosso Region**: 13 km S Dosso at 12°56.6′N 3°11.0′E (1 ♀). **Tillaberi Region**: 10 km S Ayorou (1 ♀, BMNH), 13 km N Niamey at 13°32.6′N 2°16.4′E (1 ♂). **OMAN**: Rostaq (1 ♀, 1 ♂, KMG). **Dhofar Province**: Raysut in Qara Mountains (Guichard, 1980). **Masirah Island**: RAF camp (1 ♀, 1 ♂; 2 ♀, 1 ♂, KMG). **PAKISTAN**: **Sind**: 30 km ENE Karachi on Karachi-Hyderabad road (1 ♀), Kirthar National Park 150 km NE Karachi, 25°10′–26°05′N 67°10′–67°55′E (2 ♂), Malir River 5 km ESE Karachi airport (6 ♂). **PORTUGAL**: Aljezur and Pêra in El Algarve Province (Gajubo, 1984b), Cascais: Boca de Inferno (de Andrade, 1949), Cova do Vapor (Diniz, 1964), Douro (1 ♂), Lisboa: Benfica (de Andrade, 1949), Lagoa de Albufeira (1 ♀, 2 ♂), Praia de Macãs (Diniz, 1964), Resende 50 km E Porto (1 ♂), Seixal (Diniz, 1964), Sines (Diniz, 1964), Trafaria (de Andrade, 1949), Troia (Diniz, 1964). **ROMANIA**: Calafat (Pulawski, 1971). **RUSSIA**: **Rostov Oblast'**: Vëshenskaya village area at 49°37′N 41°45′E (Shkuratov, 2000). **SAUDI ARABIA**: El Riyadh (Pulawski, 1971). **SENEGAL**: Bayakh 48 km E Dakar (1 ♂), Ferlo: Feté-olé (1 ♀; 3 ♀, 2 ♂, UCD), Linguère (1 ♂, MSNT), 40 km ESE Louga (1 ♀), Ndangane 45 air km SE Mbour (1 ♀, FB), 3 km W Samba Dia = 70 air km W Kaolack (1 ♀, 3 ♂), St.-Louis (1 ♀, MSNT), Tiougoune (1 ♂, FSAG). **SOMALIA**: Hargeisa (1 ♀, 1 ♂, BMNH). **SOUTH AFRICA**: **Eastern Cape Province**: 28 km S Steytlerville: Wolwekraal Farm (1 ♂, USU), Willowmore (3 ♀, 1 ♂, SAM, including holotype of *miscophoides*; 3 ♀, TMP). **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♀, 1 ♂, PPRI), Buffels SW Springbok (1 ♀, OÖLM), W Calvinia (1 ♂, OÖLM), Goegap windmill at 29°37′S 17°59′E (1 ♀, AMG), E Kamieskroon (1 ♀, OÖLM), SW Loeriesfontein (2 ♂), 50 km SW Springbok (1 ♂, OÖLM). **Western Cape Province**: Bulshoek between Klawer and Clanwilliam (1 ♀, SAM), Matjiesfontein (1 ♀, 1 ♂, BMNH). **SPAIN**: **Alicante**: Orihuela (Gayubo and Mingo, 1988). **Almería**: Gérgal (Suárez, 1969), Tijola (Gayubo and Mingo, 1988). **Ávila**: Gilbuena near Becedas (1 ♂), La Herguijuela (Gayubo, Asís, and Tormos, 1990a), Santa Cruz del Valle (Gayubo and Mingo, 1988). **Badajoz**: Mérida (Gayubo, Asís, and Tormos, 1990a). **Baleares**: Ibiza (Giner Marí, 1934). **Burgos** (Gayubo and Sanza, 1986): Doña Santos, Fuentespina, Tubilla del Lago. **Castellón de la Plana**: Sierra Engarcerán (Asís and Jiménez, 1988), Villafranca del Cid (Gayubo and Tormos, 1986). **Gerona**: Sils (Pulawski, 1971). **Granada**: Granada (de Beaumont, 1947c). **Jaen**: Martos (Pulawski, 1971). **Madrid** (Gayubo and Mingo, 1988, or as indicated): El Escorial (1 ♂, TMP), Montarco, Monte de el Pardo (Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004), Ribas de Jarama, Villaverde, Zarzalejo. **Málaga**: Málaga (Pulawski, 1971), Marbella (de Beaumont, 1962). **Salamanca** (Gayubo, 1984a, if not indicated otherwise): Calvarrasa de Arriba, La Alberca (2 ♀), La Encina 14 km S Ciudad Rodrigo, Palacios Rubios, San Martín del Castañar (Cruz-Sánchez et al., 2005), Villaflores. **Soria** (Gayubo, García, Torres, and González, 1999): Cidones (incorrectly transcribed as Diones) 14 km W Soria, Lubia, Rabanera del Campo, Sauquillo del Campo, Tardajos de Duero, Villalbuena, Villaverde del Monte, Vinuesa. **Toledo**: Toledo (1 ♀, 1 ♂). **Valencia**: Bétera (Gayubo and Mingo, 1988). **Valladolid**: Viana de Cega (Gonzáles, Gayubo, and Torres, 1999). **Zamora** (Gayubo, 1986a): Argujillo 10 km E Fuentesaúco, Fermoselle, Fuentelapeña, Mayalde. **SUDAN**: Wadi Medani (Pulawski, 1971). **SYRIA**: Arne Huran and Sahl near Damascus (Pulawski, 1971), Yabroud (1 ♀). **TAJIKISTAN**: Dushanbe (1 ♂), Kabadian (1 ♂, ZIN, lectotype of *rugosus*). **TANZANIA**: **Coast Region**: 17 km E Chalinze (1 ♂). **Iringa Region**: 18 km W Iringa (1 ♂). **Kilimanjaro Region**: Mkomazi Game Reserve: near Dindera Dam (1 ♀, 1 ♂, SAM) and Ibaya (4 ♀, 2 ♂, SAM), 18 km S Same (1 ♀), 19 km SE Same (3 ♂), 20 km SE Same (1 ♀). **Morogoro Region**: 128 road km NW Morogoro (1 ♂). **Singida Region**: 20 mi SW Itigi (1 ♀). **Tanga Region**: 73 km NW Korogwe (1 ♀,

1 ♂), 84 km NW Korogwe (1 ♀), 10 km WNW Mabokweni (1 ♀, 2 ♂), 2 km NE Mkomazi (3 ♀, 7 ♂), Pangani River Camp 86 km NW Korogwe (2 ♀). **TOGO**: Sokodé (1 ♀, 1 ♂, FSAG). **TUNISIA**: Chott el Djerid 5 km N El Faouar at 33°26′N 8°41′E (1 ♂, CSE), Djerba Island (1 ♂), 10 km E Kasserine (1 ♂), 12 km W Matmata at 33°32′N 9°50′E (1 ♂, CSE), N Metlaoui at 34°26′N 8°25′E (1 ♀), 15 km W Nefta at 33°50′N 7°43′E (3 ♀, 1 ♂, CSE), Sbeitla at 35°32′N 9°45′E (1 ♂, CSE), Sfax (de Beaumont, 1947a). **TURKEY**: **Hatay**: Antakya (1 ♀). **Istanbul**: Kilyos (Pulawski, 1971). **Kayseri**: Haçilar (1 ♀, CSE). **Konya**: Sille (Pulawski, 1971). **Mersin**: Köselerli 48 km NW Silifke at 36°33′N 33°27′E (1 ♀, CSE), Mut (1 ♀), Tarsus (1 ♂). **TURKMENISTAN**: Askhabad (1 ♂, holotype of *quadrifurci*), Gyaurs (1 ♀), 5 km S Tedjen (1 ♀). **UKRAINE**: **Crimea**: Zamorsk near Kerch (Pulawski, 1971). **UZBEKISTAN**: Aman Kutan 35 km SW Samarkand (Pulawski, 1971), Nishan (1 ♀). **YEMEN**: Aden: Khormak sar (Pulawski, 1971), Al Kakdan (1 ♀, 1 ♂, ZMAN), Lahj (2 ♀, 2 ♂; 3 ♀, 8 ♂, RMNH; 2 ♀, 1 ♂, ZMAN), Rougrapat in Wadi el Gaber (1 ♂, MHNCF), Sanaa (3 ♂; 1 ♀, 8 ♂, RMNH). **ZAMBIA**: **Eastern Province**: 50 km NW Chipata (1 ♂). **Northern Province**: 60 km N Kasama (1 ♂), 76 km S Kasama (1 ♂). **ZIMBABWE**: Redbank at Kami River (2 ♂), Sawmills (1 ♀, SAM, holotype of *lugubris*).

Tachysphex brinckerae R. Turner

Figures 68, 69.

Tachysphex brinckerae R. Turner, 1917a:323, ♀. Holotype: ♀, South Africa: Gauteng: Pretoria (BMNH), examined.— Arnold, 1923:173 (original description copied), 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:272 (listed).

Tachysphex consanguineus Arnold, 1924:67, ♀, ♂. Lectotype: ♂, South Africa: North-West Province: Lichtenburg (TMP), **here designated**, examined. **New synonym**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:273 (listed).

LECTOTYPE SELECTION.— Arnold designated a female and a male as types of *consanguineus*. I have selected the male as the lectotype.

RECOGNITION.—*Tachysphex brinckerae* has a labrum convex and protruding beyond the clypeus free margin, a galea longer than wide in profile (length equal to 0.8 of the scape), and the propodeal dorsum glabrous at least apicomesally, the glabrous area extending from base to apex in many specimens (Figs. 58c, d). In addition, the gaster is bicolored (red basally, black apically), tergum IV lacks a silvery fascia, the tibiae are red, and the male lacks a foretarsal rake (forebasitarsus without preapical spines or at most with one such spine at about two thirds of tarsomere length; outer apical spine of tarsomere II at least slightly shorter than tarsomere III). Subsidiary recognition features include: forefemur densely, uniformly punctate and wing membrane yellowish except in some males

JUSTIFICATION OF NEW SYNONYMY.— In spite of its aberrant propodeal dorsum (see Description below), the holotype female of *brinckerae* appears to be conspecific with the syntypes of *consanguineus* and all other specimens examined (see Recognition above). Therefore, I treat these two names as synonyms.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea densely punctate (except anteriorly), as long as 0.8 of scape. Scutal punctures less than one diameter apart. Mesopleuron dull, uniformly micropunctate. Episternal sulcus complete in female. Propodeal dorsum evenly microareolate, but finely rugose in holotype of *brinckerae*; side ridged in most females (unridged in females from Wolwekraal Farm), in male inconspicuously ridged to uniformly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae subappressed and shorter than midocellar diameter on each side of oral fossa next to occipital carina; appressed on postocellar area and scutum; propodeal dorsum largely glabrous in most specimens, with glabrous area extending from base or nearly so to apex Fig. 68c), but largely setose in holotype of *brinckerae* in which glabrous area is reduced to about apical half of dor-

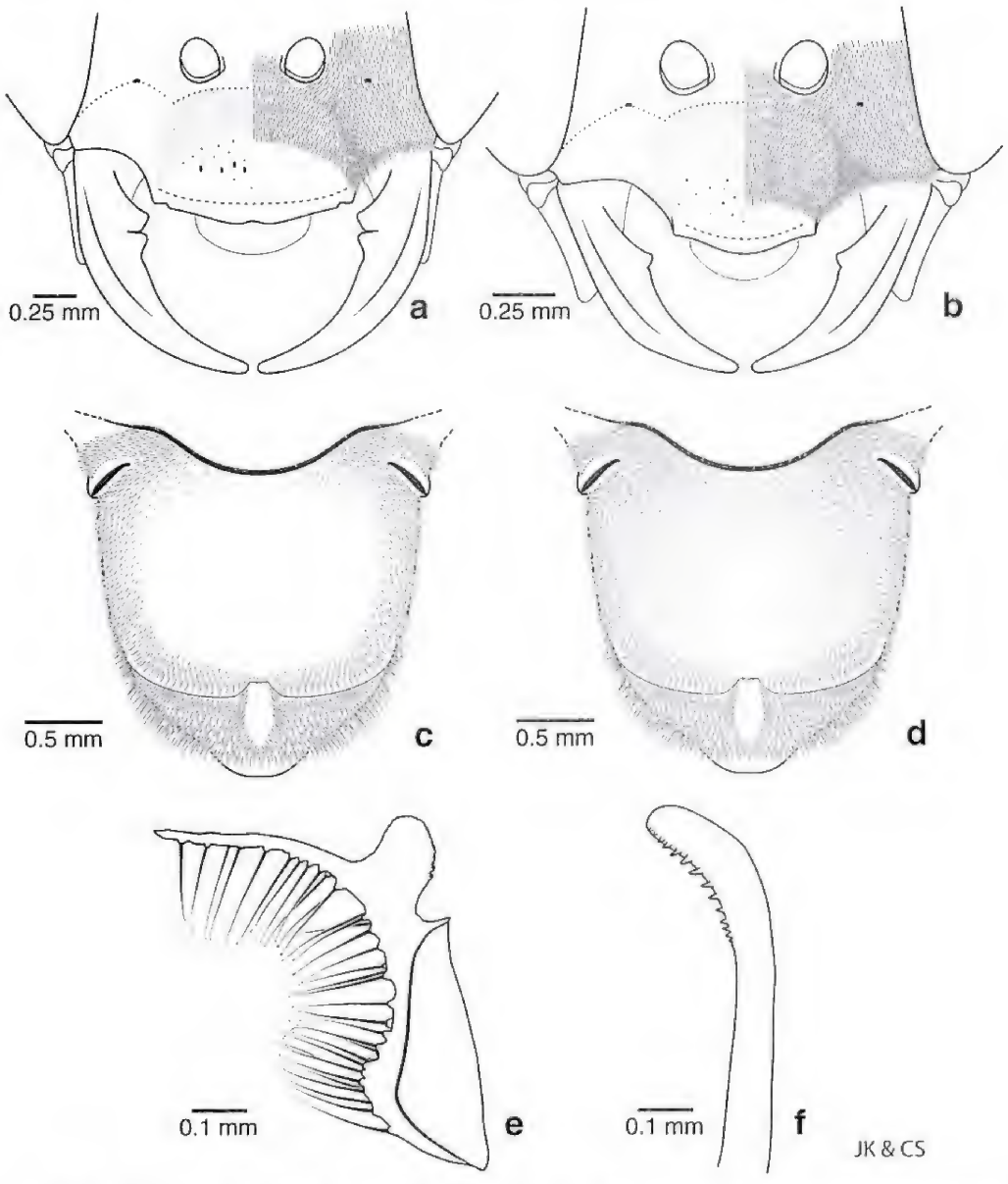

FIGURE 68. *Tachysphex brinckerae* R. Turner: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum of an average female showing setal pattern; d – propodeal dorsum of the holotype of *brinckerae*; e – volsella; f – penis valve.

sum length (Fig. 68d). Mesopleural setae in most specimens inconspicuous, not concealing integument, but markedly denser, partly concealing cuticle in females from Wolwekraal Farm, South Africa.

Head and thorax black, mandible yellowish red except basally and apically. Frontal setae silvery or golden in female, golden in male. Wing membrane yellowish in female and most males,

slightly infumate (almost hyaline) in some males; forewing costal and subcostal veins reddish in most specimens, but costal vein brown in male collected 10 mi SW Willowmore, South Africa, and subcostal vein light brown and costal vein brown in male from Touwsrivier area, South Africa. Femora varying from all red (except fore- and midfemora black basodorsally) to nearly all black (red distally); tibiae and tarsi red. Gastral segments I and II or I–III red, remainder black. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 68a): bevel longer than basomedian area; lip free margin arcuate, incised laterally, with rudimentary mesal notch. Width of postocellar area 0.9 × length. Dorsal length of flagellomere I 2.6 × apical width. Dorsal foretibial surface with two or three spines, outer surface with one spine near midlength. Forebasitarsus with seven or eight rake spines. Apical spines of hindtarsomere IV nearly reaching claw bases. Tergum V densely punctate, including apical depression. Pygidial plate microsculptured, with punctures averaging 2–3 diameters apart (many punctures less than one diameter apart). Length 11.0–14.0 mm.

♂.— Mandible: trimmal carina with tooth, at most with rudimentary cleft. Clypeus (Fig. 68b): bevel about as long as basomedian area; lip free margin arcuate or sinuate, with well-defined corner; distance between corners about equal to distance between corner and respective orbit. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 1.8–1.9 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines or with one spine at about two thirds of tarsomere length (on one leg only in some specimens); outer apical spine of foretarsomere II shorter than tarsomere III (slightly to markedly so). Sternum VIII tridentate apically, but middle tooth inconspicuous in some specimens. Length 8.4–10.9 mm. Volsella and penis valve: Figs. 68e, f.

Floral records.— The specimen found east of Skeleton Coast, Namibia, was visiting flowers of *Zygophyllum simplex* Linnaeus, as recorded by F.W. and S.K. Gess, the collectors.

Geographic distribution (Fig. 69).— Zaire to Namibia and South Africa (including Lesotho).

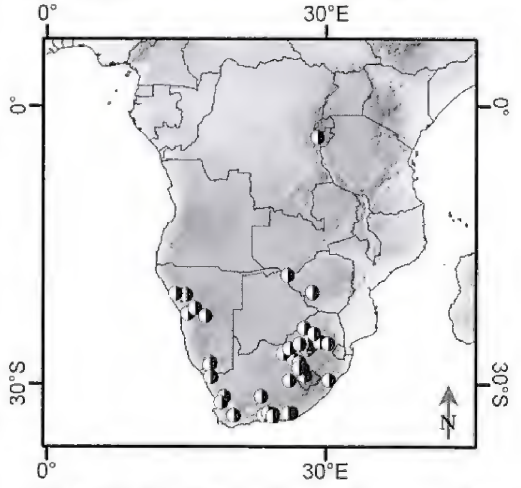

Figure 69. Collecting localities of *Tachysphex brincki*.

Records.— **LESOTHO**: Mamathes (1 ♀; 1 ♀, AMG), Teyateyaneng (1 ♀, AMG). **NAMIBIA**: **Karasburg District**: Fish River Canyon (1 ♂, AMG), Fish River Canyon 13 km E Ai Ais at 27°55′22″S 17°31′04″E (1 ♂, CSE). **Karibib District**: Khan River 23 km N Karibib (1 ♂), 55 km SW Usakos (1 ♀), 65 km SW Usakos (1 ♀, MS). **Khorixas District**: Bethanis (1 ♀, NMN), 4 km E Khorixas (1 ♂), road 3245 E Skeleton Coast Park at 20°14′S 13°53′E (1 ♂, AMG). **Windhoek District**: 8 km S Windhoek (1 ♀, FSCA). **SOUTH AFRICA**: **Eastern Cape Province**: Clifton Farm 18 km NW Grahamstown (1 ♂, AMG), Grahamstown: Swartwaterpoort (1 ♂, AMG), Reddersburg (1 ♀, AMG), 6 km N Steytlerville (1 ♂; 1 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (1 ♀, 1 ♂; 1 ♀, 1 ♂, USU), Willowmore (1 ♀, TMP, paralectotype of *consanguineus*), 43 km NE Willowmore: Plessierivier (2 ♂, USU), 37 km NW Willowmore in Grootrivierberg Range (1 ♂, USU), 10 mi SW Willowmore (1 ♂, KU). **Free State**: Bothaville (2 ♂, AMG), Kroonstad (2 ♀, AMG), Senekal (1 ♂, AMG), Willem Pretorius Game Reserve (1 ♂, AMG). **Gauteng**: Florida Hills (1 ♂), Florida: Strubens Valley (1 ♀; 2 ♀, 4 ♂, AMG), Hartbeeshoek Radio Station ca 45 km WSW Pretoria at 25°53′S 27°41′E (9 ♂), Johannesburg: Mondeor Hills (1 ♂, AMG), Nkwe Pleasure Resort SE Pretoria at 25°53′S 28°26′E (2 ♂, PPRI),

Pretoria (1 ♀, BMNH, holotype of *brinckerae*), 25 km W Pretoria (1 ♀, PMA), Tswaing (1 ♂; 1 ♂, PPRI). **Kwazulu-Natal**: Pietermaritzburg (1 ♂, FSCA). **Mpumalanga**: Loskop Dam Nature Reserve (1 ♂; 6 ♂, PPRI), O.T.K. [= Oostelike Transvaalse Koöperasie] Nature Reserve near Loskop Dam at 25°27′S 29°24′E (1 ♂; 1 ♀, 3 ♂, PPRI), Waterval-Boven (1 ♀, OÖLM). **Northern Cape Province**: Nieuwoudtville (1 ♂, BMNH), Steinkopf and 10 km W Steinkopf (2 ♂, FSCA), Victoria West (1 ♀, AMG). **Northern Province**: Mogol Nature Reserve (5 ♂, PPRI), 10 km SW Naboomspruit (3 ♀, 4 ♂, FSCA). **North-West Province**: Delareyville (Arnold, 1924), Lichtenburg (1 ♂, TMP, lectotype of *consanguineus*), Rustenburg (1 ♀, AMG). **Western Cape Province**: Bulshoek between Klawer and Clanwilliam (1 ♂, SAM), 18 mi SE Touwsrivier (1 ♂, KU). **ZAIRE**: **Kivu**: 10 mi N Uvira (1 ♀). **ZIMBABWE**: Bulawayo: Hillside (1 ♂), Bulawayo: Umguza River (4 ♂; 1 ♂, NHMZ), Matetsi in Hwange District (4 ♀, 1 ♂, AMG).

Tachysphex bruneiceps Arnold

Figures 70–72.

Tachysphex bruneiceps Arnold, 1923:153, ♀. Lectotype: ♀, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae), 1945:97 (Madagascar), 1951:155 (Ethiopia); Leclercq, 1960:98 (Madagascar), 1961:109 (Madagascar); Bohart and Menke, 1976:273 (listed); Leclercq, 1990b:117 (Madagascar); Hancock, Chahwanda, and Mhlanga, 1995:40 (syntypes in Bulawayo Museum); Madl, 1997:821 (in checklist of Nosy Boraha Sphecidae); Pulawski, 2003:797 (in checklist of Malagasy Sphecidae); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Recognition.— *Tachysphex bruneiceps* has erect, conspicuous setae on the basal declivity of tergum I (as in Fig. 16), and hindwing crossvein cu-a is oblique (the anal end is markedly further away from the wing base than the cubital end). Unlike *albocinctus* and *detritus* (which share these characters), the postocellar area of *bruneiceps* is broad (Figs. 70a, b, width 1.7–2.0 × length rather than 0.6–0.8 in female and 0.7–1.3 in male), scutal punctures average 2–3 to many diameters apart on the disk (rather than one diameter or less) and in most specimens are minute, inconspicuous (well defined in *albocinctus*). Subsidiary recognition features shared with *albocinctus* are: forebasitarsus expanded apically (as in Figs. 15c, d) except not expanded in occasional males, female pygidial plate broad, uniformly granulose except for superficial, sparse punctures (as in Fig. 15e), and male sterna largely glabrous, the only erect setae being those that delimit apical depressions.

Description.— Postocellar area shiny, unsculptured or slightly sculptured. Scutal punctures averaging 2–3 to many diameters apart on disk, inconspicuous in most specimens but relatively well defined in single female from Luangwa bridge area, Zambia; interspaces microsculptured, dull (Fig. 71a), apparently an effect of microscopical, longitudinal grooves on the integument (Fig. 71b). Mesopleuron conspicuously microsculptured, dull, punctures below scrobe several to many diameters apart. Punctures of mesothoracic venter averaging 1–2 diameters apart, but many diameters apart posteromesally in some males. Propodeal dorsum evenly microareolate or finely rugose, side dull, evenly microsculptured, in many specimens also finely, irregularly rugose (except anteriorly); posterior surface, in dorsal third or so, with wide median impression. Hindwing crossvein cu-a oblique (anal end further away from wing base than cubital end). Forebasitarsus expanded apically (as in Figs. 14c, 14d) except not expanded in occasional males. Hindcoxal dorsum with inner margin not carinate or carinate basally. Apical tarsomeres with several ventral bristles, but no spines on venter or lateral margin. Sternum I shallowly depressed apically.

Setae sinuous on frons, scapal venter, postocellar area (Figs. 70a, b), gena, scutum (at least anteriorly), mesopleuron, propodeum (including posterior surface); suberect to erect on frons, scapal venter, postocellar area, gena, and basal declivity of tergum I; hindfemoral venter at least with a few erect setae (erect setae missing in single female from Isoanala, Madagascar). Setal length expressed as a fraction of basal mandibular width: 0.8–1.0 on postocellar area and on each side of

oral fossa next to occipital carina, about 0.5 on scutum posteriorly, and up to 0.8 on tergum I. Mesopleural setae not concealing integument.

Body black except mandible dark red mesally and tarsi red (black basally). Frontal setae yellowish or silvery in female, black in large males, silvery in small males. Wings membrane hyaline, slightly yellowish; forewing costal vein brown, subcostal vein dark brown. Terga I–IV in continental African populations, I–III in those from Madagascar, silvery fasciate apically.

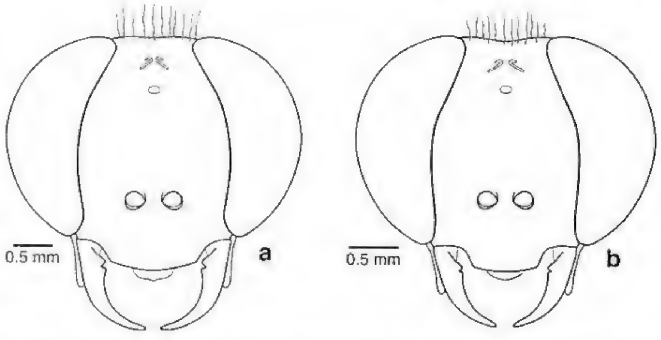

FIGURE 70. *Tachysphex bruneiceps* Arnold: a – female head in frontal view; b – male head in frontal view.

♀.— Clypeus (Fig. 70a): bevel convex, about one third length of basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 1.7–1.9 × length. Dorsal length of flagellomere I 2.5–2.6 × apical width. Dorsal foretibial surface with three spines, outer surface with two or three spines. Forebasitarsus with seven or eight rake spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate broad, uniformly granulose except for superficial, sparse punctures (as in Fig. 15e). Length 10.8–11.8 mm.

♂.— Inner mandibular margin with tooth and cleft. Clypeus (Fig. 70b): bevel about one third length of basomedian area; lip free margin arcuate, with obtusely angulate, nonprominent corner; distance between corners 1.8–1.9 × distance between corner and orbit. Width of postocellar area 1.7–2.0 × length. Dorsal length of flagellomere I 2.2–2.3 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with six or seven rake spines; apical spine of tarsomeres I and II longer than following article. Punctures of tergum VII varying from one to several diameters apart. Punctures of sternum II slightly to markedly sparser mesally than laterally, apical depression glabrous (except laterally); sterna III–VI largely glabrous. Length 6.6–11.0 mm. Volsella and penis valve as in *albocinctus* (see Figs. 14e–g).

GEOGRAPHIC DISTRIBUTION (Fig. 72).— Senegal to South Africa, Madagascar.

RECORDS.— IVORY COAST: Grand Béréby (4 ♀, 8 ♂; 1 ♀, MSNT), 40 km S Toumodi (2 ♂). **KENYA**: **Coast Province**: Voi area (2 ♀, 1 ♂, OÖLM). **Rift Valley Province**: Marich Pass Field Studies

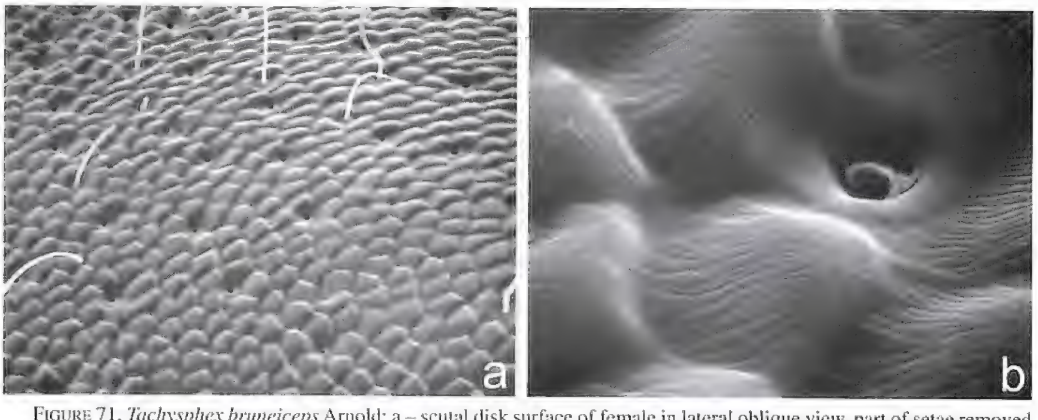

FIGURE 71. *Tachysphex bruneiceps* Arnold: a – scutal disk surface of female in lateral oblique view, part of setae removed to show punctures and distances between them (×300); b – same, higher magnification (×3000).

Centre (1 ♀, 3 ♂). **MADAGASCAR**: **Antsiranana**: Parc National Montagne d'Ambre at 12°31′13″S 49°10′45″E (1 ♀), 3 km W Sakalava Beach (1 ♀). **Fianarantsoa**: Ambinany 7 km W Manombo (1 ♀, 2 ♂), Isalo area at 22°42′S 45°13′E (4 ♂; 1 ♂, MRAC), Isalo National Park at 22°36′S 45°10′E (2 ♀, 7 ♂; 7 ♀, 6 ♂, MSNT), 2 km SW Manakara at 22.168°S 48.00°E (1 ♂), 10 km E Ranohira (1 ♂). **Mahajanga**: Amborovy 8 km N Mahajanga (3 ♀, 11 ♂), Ankarafantsika (1 ♂, MHNB), Mahatazana (2 ♀, MHNB). **Toamasina**: near entrance to Andasibe National Park at 18°55.6′S 48°24.5′E (1 ♂), Ivoloina (1 ♂, LB), Mahavelona (1 ♂, MHNB; 4 ♀, 2 ♂, MRAC), Nosy Boraha (1 ♀, MNHN), Nosy Boraha: Ampangorinana (1 ♀, 1 ♂, MHNB), Toamasina (1 ♀, MHNB; 1 ♀, MNHN). **Toliara**: Anantsono (1 ♀, BMNH), Behara (1 ♀, 1 ♂, MNHN; 1 ♀, SAM), Bekily (6 ♀, 4 ♂, MNHN; 2 ♀, 2 ♂, SAM), Berenty (1 ♀), 22 km N Betioky (1 ♀, 2 ♂), Isoanala (1 ♀, MNHN), 50 km NE Morondava (1 ♀, 1 ♂; 1 ♂, MRAC), Ranobe at 23°02.30′S 43°36.58′E (1 ♀), St. Augustin area (1 ♀, BMNH), Taolanaro (1 ♀, MNHN), 12 km SE Toliara at 23°25′S 43°45′E (1 ♀, 7 ♂), Tongobory (1 ♂, BMNH), Zombitsy Forest (1 ♀, BMNH). **NAMIBIA**: **Okahandja District**: Waldau River 17 km W Okahandja (1 ♂). **Otjiwarongo District**: Waterberg (2 ♀, CSE). **Windhoek District**: Aris (1 ♂, MS). **SENEGAL**: Dakar (1 ♀, FB), Ndangane 45 air km SE Mbour (1 ♀, FB). **SOUTH AFRICA**: **Northern Province**: Afguns (1 ♂, AMG), Guernsey Farm 15 km NW Klaserie (1 ♀, PMA). **TANZANIA**: **Morogoro Region**: Ruaha River bank 7 km S Mikumi (7 ♀; 2 ♀, UDS). **Tanga Region**: Pangani River Camp 86 km NW Korogwe (1 ♀). **TOGO**: Amaoudé 17 km N Sokodé (2 ♂), 8 km N Sotoboua (2 ♂). **ZAIRE**: Abumombazi (1 ♀, 1 ♂, MRAC), 100 km E Kenge (1 ♂), Ubangi: Binga (1 ♂, MRAC). **ZAMBIA**: **Eastern Province:** E side of Luangwa bridge (1 ♀, 1 ♂), 6–18 km SW Mfuwe (2 ♀). **Location unknown**: Pakasa (2 ♂, BMNH), no specific locality (1 ♀, AMG). **ZIMBABWE**: Bubye River 80 km NE Beit Bridge (1 ♂, OÖLM), Bulawayo (1 ♀, 1 ♂, AMG), Kami (2 ♀, SAM), Plumtree (Arnold, 1923), Redbank at Kami River (7 ♂), Sawmills (2 ♂, AMG; 1 ♀, AMNH; 5 ♀, 12 ♂, SAM, including lectotype ♀and paralectotype ♂ of *bruneiceps*; 2 ♀, 4 ♂, TMP; 1 ♀, ZMA; 1 ♂, ZMLU), Victoria Falls (1 ♀, NRS).

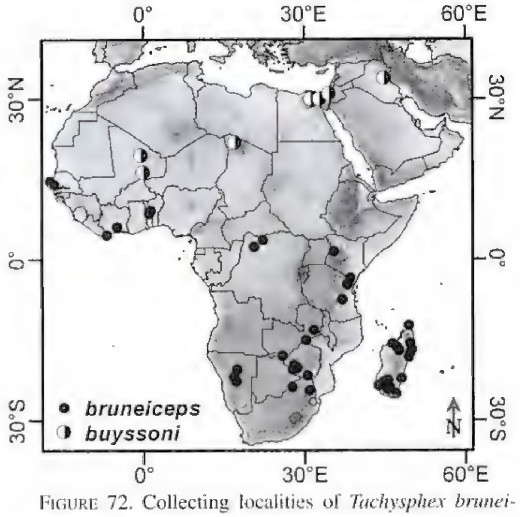

FIGURE 72. Collecting localities of *Tachysphex bruneiceps* and *buyssoni*.

Tachysphex buyssoni Morice

Figures 72, 73.

Tachysphex buyssoni Morice, 1897:307, ♀, ♂. Lectotype: ♀, Egypt: Koubbeh near Cairo (OXUM), designated by Pulawski, 1971:295, examined before 1974.— nec Guiglia, 1932:475 (= *Tachysphex costae*); de Beaumont, 1940:164 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:158 (in revision of Egyptian *Tachysphex*), 1956a:196 (Chad: Tibesti), 1961c:4 (Iraq); Pulawski, 1971:293 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:10 (Israel); Bohart and Menke, 1976:273 (listed); Dollfuss, 1989:13 (type material in NHMW); Roche and Zalat, 1994:115 (Sinai Peninsula).

RECOGNITION.— *Tachysphex buyssoni* is one of the species in which the labrum is conspicuously convex and markedly protruding from beneath the clypeus, and the galea is longer than wide in profile. It differs from all its congeners in having an unusually large mandibular notch (Figs. 73c, d).

DESCRIPTION.— Mandibular notch larger than in other *Tachysphex*, longer than distance that separates it from mandibular base (Figs. 73c, d). Labrum convex, protruding from beneath clypeus. Galea longer than wide in profile, closely microscopically punctured, as long as 0.8–0.9 of

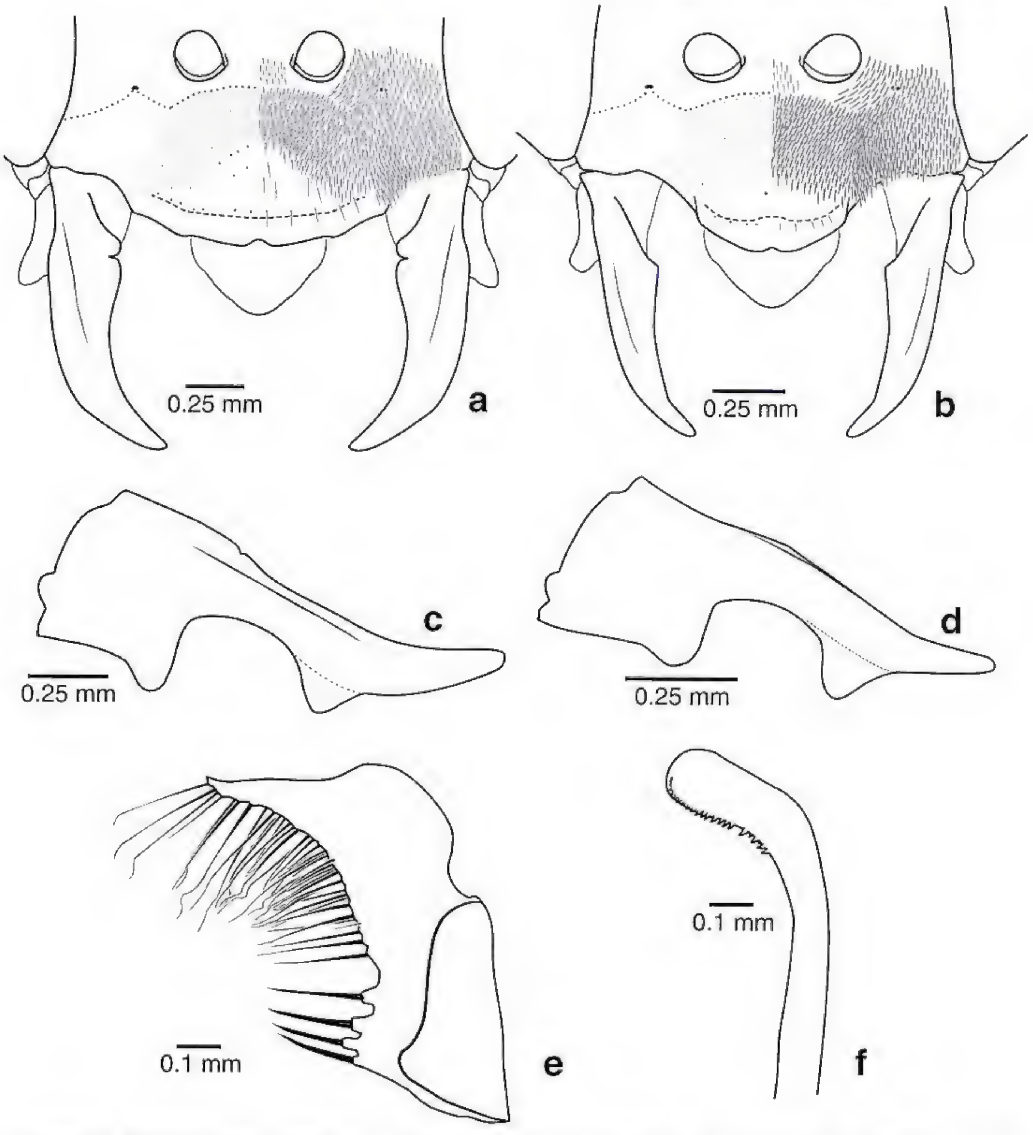

FIGURE 73. *Tachysphex buyssoni* Morice: a – female clypeus and mandible; b – male clypeus and mandible; c – female mandible, outer side; d – male mandible, outer side; e – volsella; f – penis valve.

scape in female, minimally more than scape in male. Scutal punctures minute, ill defined, less than one diameter apart. Mesopleuron as well as propodeal dorsum and side uniformly microsculptured; posterior surface with ill-defined ridges. Hindwing: crossvein cu-a either vertical or oblique (cubital end closer to wing base than anal end). Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; about one midocellar diameter long on each side of oral fossa next to occipital carina; fully concealing mesopleural sculpture in female, largely so in male; setal pattern varying on propodeal dorsum, but apicomedian setae oriented posterad; and propodeal side all setose.

Head and thorax black in most specimens, but mandible (except apically) and clypeal bevel and lip yellowish red (all middle clypeal section in some males), and thorax dark reddish in a female from Iraq (de Beaumont, 1961c). Frontal setae silvery in female and some males, golden in most males. Wing membrane hyaline or nearly so, all veins yellowish brown. Femora varying from all black (except apically) to largely red; tibiae and tarsi red. Gaster all red or apex black (only middle terga black in some specimens). Terga I–V in female, I–III or I–IV in male, silvery fasciate apically.

♀.— Clypeus (Fig. 73a): bevel slightly longer than basomedian area; lip free margin arcuate, shallowly emarginate mesally, sinuous laterally. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.5–3.5 × apical width. Dorsal foretibial surface with three spines, outer surface with two or three spines. Forebasitarsus with nine or ten rake spines. Apical spines of hindtarsomere IV reaching claw bases. Tergum V evenly micropunctate and setose, including apical depression. Pygidial plate with punctures that average many diameters apart, interspaces microsculptured or unsculptured. Length 10.0–16.3 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 73b): bevel shorter to about as long as basomedian area; lip free margin arcuate, shallowly emarginate mesally, corner varying from well defined to ill defined; distance between corners 0.9 × distance between corner and orbit; fine, oblique carina emerging from each lip corner. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.3–2.7 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with six or seven rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 7.0–11.5 mm. Volsella and penis valve: Figs. 73e, f.

Collecting period.— The specimens from Mali were collected between 20 October and 2 November, that from Chad on 23 March, those from Egypt between 23 April and 22 May, and that from Revivim, Israel on 19 June.

Geographic distribution (Fig. 72).— Mali, Chad, Lower Egypt, Israel, Iraq.

Records.— CHAD: Enneri Meché in Tibesti Mountains (de Beaumont, 1956a). **EGYPT** (from Pulawski, 1971, or as indicated): **Al Fayyum**: Fayyum road (almost certainly Kom Osheim). **Al Jizah** (= Ghiza): Abu Rawash (2 ♀). **Al Qahirah** (= Cairo): Abbasiya (1 ♀, NHMW), Gebel Asfar (1 ♀), Heliopolis, Kubbah (Morice, 1897), Maadi (1 ♀). **Sina** (= Sinai): Wadi um Mitla (1 ♂). **IRAQ**: Muqdadia (de Beaumont, 1961c). **ISRAEL**: Revivim in Negev Desert (de Beaumont, Bytinski-Salz, and Pulawski, 1973). **MALI**: Tilemsi Valley N Gao (1 ♂, KMG), Timetrin in Tilemsi Valley (1 ♀, KMG).

Tachysphex caliban Arnold, new status

Figures 74–76.

Tachysphex panzeri var. *caliban* Arnold, 1923:169, ♀, ♂ (as *Caliban*, incorrect original capitalization; ♀ = *Tachysphex pentheri*). Lectotype: ♂, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae), 1935a:497 (Botswana); Bohart and Menke, 1976:275 (as synonym of *Tachysphex panzeri pentheri*); Hancock, Chahwanda, and Mhlanga, 1995:40 (syntype in Bulawayo Museum).

Lectotype selection.— Arnold's syntypes of *Tachysphex caliban* are a mixture of two species. The male, which I have selected as the lectotype, belongs to this species, whereas the paralectotype female is *Tachysphex pentheri*.

Recognition.— The southern African *caliban* has the labrum convex and protruding beneath the clypeal free margin and the galea longer than wide in profile. Furthermore, the setae are appressed on the postocellar area, the female has an unsculptured apical depression of tergum V, and the male a well-developed foretarsal rake. Many species share these characters, but *caliban* differs in having well-defined scutal punctures that are two or more diameters apart on at least part of

the disk. The male also has a distinctive forefemoral notch whose bottom is densely, microscopically ridged, appearing dull under lower magnifications, without recognizable micropunctures (Figs. 75a, b). A subsidiary recognition feature of the female, a minute apical process of the forecoxa, is shared with *calidus*, *socotrae*, *sycorax*, and some undescribed forms.

Tachysphex socotrae, an endemic of Socotra, resembles *caliban* in having elongate mouthparts (including galea), the labrum convex and protruding from beneath the clypeus, and well-defined, sparse scutal punctures. *Tachysphex caliban* differs, in addition to the above features, in having genal setae no longer than midocellar diameter (more than one diameter in *socotrae* adjacent to the oral fossa) and the setae of the propodeal dorsum oriented posterad in the apical half or so (rather than all setae oriented anterad). Scutal punctures are also sparse in some males of *georgii* which differ in having an unsculptured or sparsely, microscopically punctured forefemoral notch.

Similar unassigned specimens.— Three males collected 97 km E Swakopmund on the road to Usakos (AMG) closely resemble *caliban*. In particular, their scutal punctures are well defined and the interspaces are shiny, almost unsculptured. They differ in having the bottom of the forefemoral notch minutely punctate. A female from 7 km NW Prince Albert, South Africa (CAS) has a shiny scutum, with well-defined punctures that are several diameters apart, but the clypeal lip is emarginate laterally and the mid- and hindtrochanteral venters are unsculptured, shiny.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea with numerous punctures, its length equal to 1.0–1.1 of scape. Scutal punctures well defined, two to several diameters apart (depending on specimens) on at least part of the disk; interspaces varying from practically unsculptured to conspicuously microsculptured. Mesopleuron dull, conspicuously microsculptured, with minute, evanescent punctures. Propodeal dorsum evenly microareolate, side finely microsculptured, at most with dense, vestigial ridges next to metapleural sulcus. Hindcoxal dorsum with inner margin carinate basally.

Setae nearly appressed on postocellar area; about as long as midocellar diameter on each side of oral fossa next to occipital carina; on propodeal dorsum oriented obliquely anterad on basomedian portion, oriented exactly posterad along midline on apical half or more, and diverging posterolaterad on remaining surface.

Head and thorax black, mandible yellowish red (except apically). Frontal setae silvery in female, golden in male. Wing membrane nearly hyaline, yellowish in some females; forewing costal vein light brown, subcostal vein brown. Color of legs: see below. Gastral segments I and II or I–III red and remainder black, but gaster all black in many males (segments I and II with large, irregular black spots in one female from Hilton Farm, South Africa). Terga I–III silvery fasciate apically in most specimens, also tergum IV in some females (only terga I and II fasciate in some males, all fasciae nearly reduced in some others).

♀.— Clypeus (Fig. 74a): bevel at least slightly longer than basomedian area; lip free margin arcuate, emarginate mesally, sinuous laterally in most specimens, not sinuous in some. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–3.0 × apical width. Forecoxa with minute apical projection. Dorsal foretibial surface with three spines, outer surface with two or three spines. Forebasitarsus with 6–8 rake spines. Apical depression of tergum V either impunctate and asetose or with several sparse punctures and associated setae. Pygidial plate with punctures that average many diameters apart; interspaces unsculptured or aciculate. Length 9.7–11.5 mm. Femora varying from mostly red (black basodorsally) to mostly black (red apically), tibiae and tarsi red.

♂.— Mandible: trimmal carina with tooth, without cleft, reduced just distad of tooth in exceptional specimens. Clypeus (Fig. 74b): bevel not sharply delimited from basomedian area about as long as the latter; lip free margin arcuate, with well-defined corner; distance between corners 0.8 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of fla-

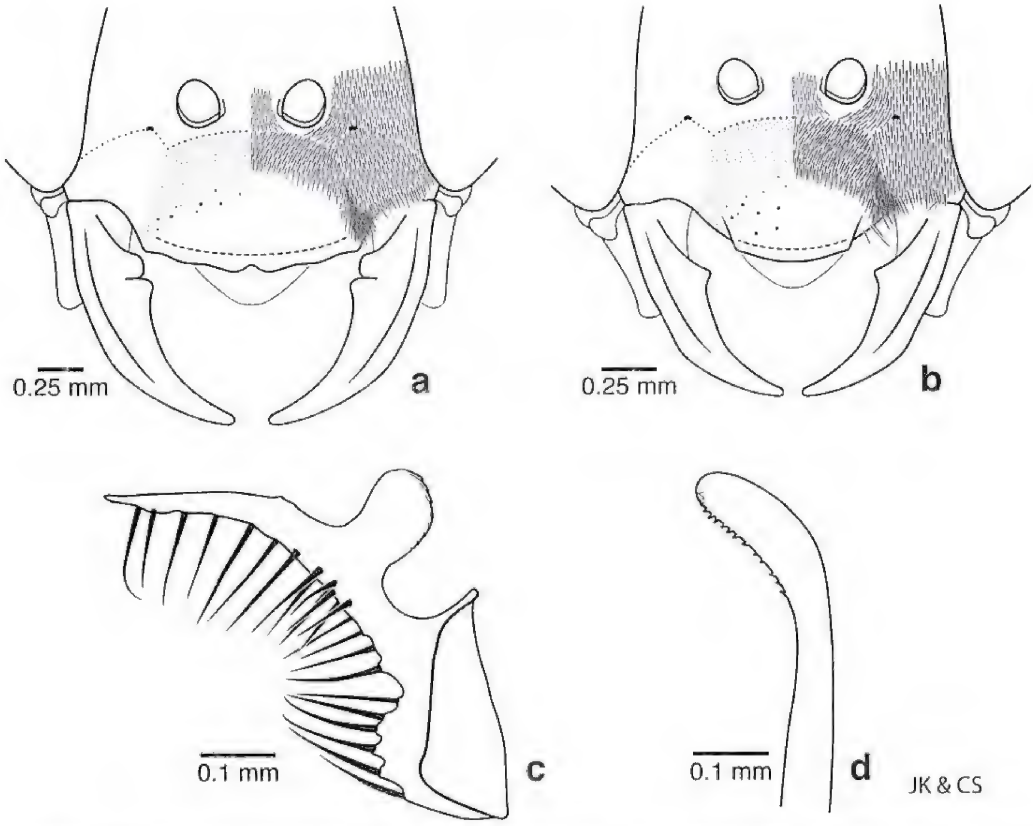

FIGURE 74. *Tachysphex caliban* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

gellomere I 2.0–2.2 × apical width. Forefemoral notch densely, microscopically ridged, dull (Figs. 75a, b). Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Several punctures of tergum VII, in some specimens, more than one diameter apart. Sternum VIII with apical margin shallowly emarginate apically, almost straight mesally in most specimens, but somewhat prominent mesally in some. Length 6.8–10.5 mm. Volsella and penis valve: Figs. 74c, d. Femora black (except apically) to largely red, tibiae and tarsi red (fore- and midtibiae darkened and hindtibia black in some males from Greyton).

PREY.— The female from De Aar, South Africa, is pinned with her prey, an acridine nymph (det. F.W. Gess).

GEOGRAPHIC DISTRIBUTION (Fig. 76).— Zimbabwe, Namibia, Botswana, South Africa.

RECORDS.— **BOTSWANA**: Kuke Pan (1 ♂, BMNH). **NAMIBIA**: **Gobabis District**: Gobabis (1 ♂, AMG). **Grootfontein District**: Grootfontein (1 ♂, AMG), 90 km NE Grootfontein (1 ♂, MS). **Khorixas District**: 117 km E Swakopmund on road to Usakos (1 ♂, AMG). **Mariental District**: 5 km N Mariental (1 ♂, MS), 71 km E Stampriet (2 ♂, AMG), Vaalbank 319 [Farm] (4 ♂, AMG). **Outjo District**: Okakuejo (1 ♂, MS). **Rehoboth District**: 7 km N Rehoboth (1 ♂, MS), 23 km N Rehoboth (1 ♂; 2 ♂, MS), 9 km S Rehoboth (1 ♀, 1 ♂). **Swakopmund District**: Kuiseb River near Gobabeb (1 ♂, PPRI). **Windhoek District**: Aris 25 km S Windhoek (2 ♂), Arnhem Farm 110 km E Windhoek at 22°41′S 18°08′E (1 ♂, LACM), Bismarck River 30 km E Windhoek (1 ♂), Nam Lodge approximately 22.8°S 18.2°E (1 ♂, BMNH), Regenstein 32 [Farm] SE

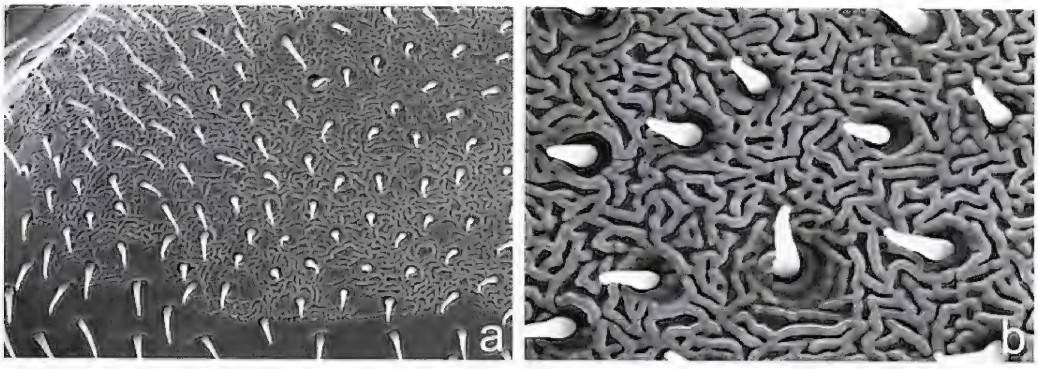

FIGURE 75. *Tachysphex caliban* Arnold: a – bottom of forefemoral notch (×930); bottom of forefemoral notch (×2800).

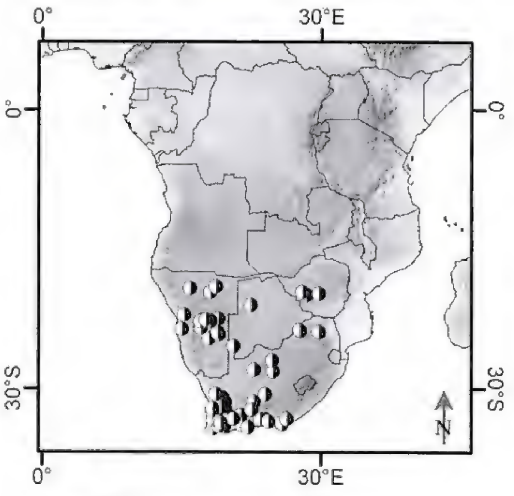

FIGURE 76. Collecting localities of *Tachysphex caliban*.

2217 Ca [= between 22°30′ and 22°45′S and 17°00′ and 17°15′E] (1 ♂, NMN), 53 km E Windhoek (1 ♂, MS). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (1 ♂, TMP), Colchester (3 ♂), Elandsheuwels Farm 40 km W Steytlerville (1 ♂, USU), 18 km WNW Grahamstown: Hilton Farm (2 ♂; 4 ♀, 16 ♂, AMG), Willowmore (3 ♂, TMP), 9 km E Willowmore (1 ♂), Wolwekraal Farm 28 km S Steytlerville (1 ♀, USU). **Northern Cape Province**: De Aar (1 ♀, AMG), W Calvinia (1 ♂, OÖLM), SW Loeriesfontein (1 ♂, OÖLM), Melton Wold (1 ♂, SAM), Nossob in Kalahari Gemsbok National Park (2 ♂; 1 ♂, MS; 3 ♂, PPRI), Olifantshoek (1 ♀, 5 ♂, FSCA), Tanqua-Karoo [National Park] (1 ♂, SAM), Warrenton (1 ♂, SAM). **Northern Province**: 1 km W Boyne (1 ♂), D'Nyala Nature Reserve (2 ♀, PPRI), Ellisras (2 ♀, 2 ♂, AMG), Turfloop at 23°53′S 29°46′E (1 ♂, ZMAN). **North-West Province**: Vryburg (1 ♂, SAM). **Western Cape Province**: Beaufort West District (1 ♂, SAM), Bulshoek between Klawer and Clanwilliam (1 ♂, SAM), Cape of Good Hope Nature Reserve near Olifantbosbaai (1 ♂), Cape Town (1 ♀, USNM), Cape Town: Milnerton (1 ♂, BMNH), 60 km N Cape Town (2 ♂; 4 ♂, OÖLM), Cederberg 15–30 km SE Clanwilliam (1 ♀, USU), Ceres (1 ♂, BMNH), 38 mi E Ceres (1 ♂, BMNH), Clanwilliam Dam at 32°11.5′S 18°55.7′E (1 ♂, AMG), near Clanwilliam on road to Pakhuis Pass (1 ♂, AMNH), Dikbome Farm on Merweville-Koup road (1 ♀, SAM), Doringbos (1 ♂, OÖLM), Greyton (1 ♂; 3 ♀, 19 ♂, OÖLM); Hottentots 40 mi from Cape Town (1 ♂, BMNH), Karoo National Park: Mountain View (1 ♀, PPRI), Kliprand 60 km WNW Loeriesfontein (2 ♂; 5 ♂, OÖLM), S of Lambert's Bay (1 ♀, 1 ♂), 40 km S Lambert's Bay (2 ♀, OÖLM), Langberg (1 ♂, OÖLM), Matjiesfontein (1 ♀, 1 ♂; 1 ♀, BMNH), Mossel Bay (2 ♀, 1 ♂, BMNH), Wellington: Rooshoek (2 ♀, 2 ♂; 5 ♀, 6 ♂, RMNH), 24 km W Worcester (1 ♂). **ZIMBABWE**: Dovenby Farm (1 ♂, SAM), 30 km S Gweru (1 ♀, 1 ♂, USU), Sawmills (4 ♂, SAM, including lectotype of *caliban*).

***Tachysphex calidus* Pulawski, sp. nov.**
Figures 77–79.

DERIVATION OF NAME.— *Calidus*, Latin for warm, hot; with reference to the hot habitats where this species occurs.

Recognition.— *Tachysphex calidus* has the labrum markedly convex, protruding beyond the clypeal free margin, and the setae of the lower gena nonsinuous, erect or suberect, long (equal to 0.3–0.4 of basal mandibular width). In addition, the propodeal dorsum is all setose and the side is uniformly microsculptured, the apical depression of female tergum V setose (glabrous mesally in some specimens), and the male foretarsus with a conspicuous rake. This combination is shared with *cheops* and males of *dolosus*.

Unlike *cheops*, the free margin of the lateral clypeal section is not unusually shallow (compare Figs. 77a, c and 91a, b). In the female, the inner mandibular margin has a well-developed subbasal tooth, whereas the tooth is reduced in *cheops* (compare Figs. 77a and 91a). In the male, the inner (= posterior) margin of the hindfemoral venter is sharp (rather than obtuse), the clypeal lip is narrower on average (distance between corners 0.7–1.0 × distance between corner and the nearest orbit rather than 1.0–1.4); the obtuse, oblique carina emerging from each lip corner extends beyond the lip (not extending in *cheops*); the clypeal bevel is well defined (almost reduced in many *cheops*); and the basal volsellar setae are thickened (Fig. 78b) rather than uniformly thin. Also, the propodeal side of *calidus* is either glabrous anteriorly (most specimens) or the setae are fine, inconspicuous along the metapleural sulcus (most West African individuals), whereas in *cheops* the entire propodeal side is conspicuously setose.

The most distinctive character separating the males of *calidus* and *dolosus* is the shape of the volsella: the dorsal process is long, narrow in *calidus* (Fig. 78) while contrastingly low, wide in *dolosus* (Figs. 124b). Also, the forefemoral notch in *calidus* has minute but recognizable punctures at the bottom, whereas in *dolosus* the bottom is densely, uniformly microsculptured, dull, without recognizable punctures (Figs. 123f, g). Fresh specimens can be recognized by the setal pattern of the propodeal dorsum: in *calidus*, at least the preapical setae are oriented posterad (Fig. 78a), whereas all setae are oriented anterad or anterolaterad in *dolosus* (Fig. 124a). Setae, however, are altered or lost in many specimens, so that the character is not often reliable.

Another similar species is *panzeri* which ranges south to central Mali and central Sudan and whose male has a low, wide dorsal volsellar process (Fig. 271). There is no single character to differentiate all females, but in the overlap area (West Africa, possibly Somalia) both sexes can be recognized, though with some difficulty, by the length of setae on the lower gena. These setae are about one midocellar diameter long in *panzeri*, but are more than one midocellar diameter long in *calidus* from Kenya, Ethiopia, and West Africa.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea uniformly, closely micropunctate, as long as scape in female, as 1.2 of scape in male. Scutal punctures moderately well defined. Mesopleuron uniformly microsculptured, without recognizable punctures. Propodeal dorsum uniformly microareolate, side uniformly microsculptured. Hindcoxal dorsum with inner margin not carinate or carinate basally. Apical spines of hindtarsomere IV reaching claw bases or nearly so.

Setae appressed on postocellar area and scutum (suberect on scutum anterolaterally in some specimens); erect or nearly so on each side of oral fossa next to occipital carina (setal length 0.3–0.4 basal mandibular width); oriented mostly anterad or mostly posterad on propodeal dorsum, but at least preapical setae oriented posterad; one common pattern is that most setae are oriented anterad except preapical setae diverge radially from a pair of vortices (Fig. 78a).

Head and thorax black, but clypeal lip yellow (female) or reddish yellow (male) and mandible reddish yellow (except apically). Frontal setae silvery in female and smallest males, golden in most males. Wing membrane slightly infumate; costal vein of forewing light yellowish (Namibia) to brown, subcostal vein brown, but both veins reddish in single male from Mali. Femora red except black basodorsally, largely to all black in some South African specimens; tibiae and tarsi red. Gaster

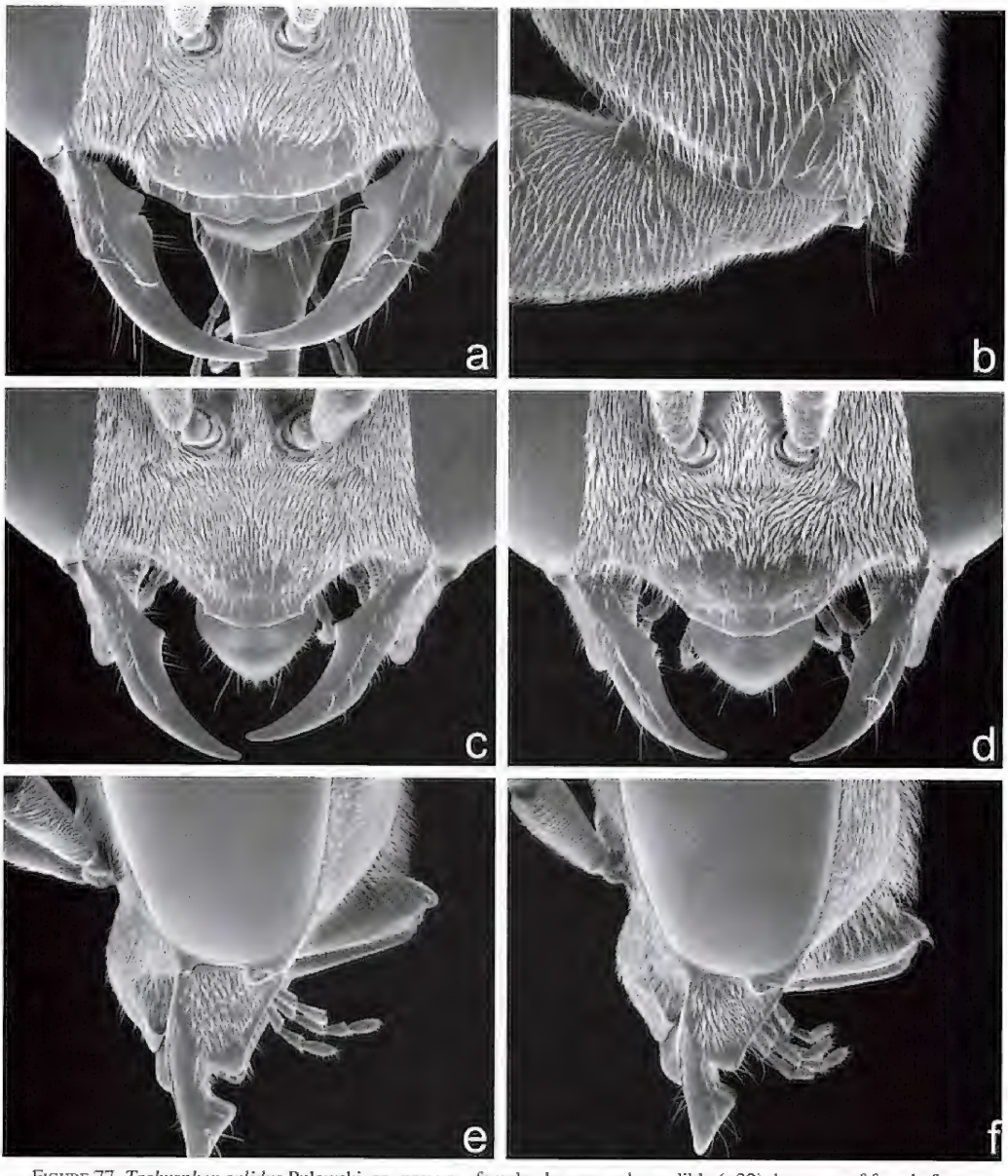

FIGURE 77. *Tachysphex calidus* Pulawski, sp. nov.: a – female clypeus and mandible (×32); b – apex of female forecoxa (×84); c – clypeus and mandible of male from Namibia (×37); d – clypeus and mandible of male from Ethiopia (×52); e – lower head of male from Namibia showing genal seta (×27); f – lower head of male from Ethiopia showing genal seta (×32).

in female largely red (only segment IV or segments IV and V black) to largely black (specimens from Bredasdorp, South Africa, in which only sterna II and III partly and segment VI are red); red basally in male (segments I and II or I–III) with remainder black, but all black in specimens from Bredasdorp. Terga I–III or I–IV silvery fasciate apically (see Variation below).

♀.— Clypeus (Fig. 77a): bevel varying from slightly shorter to slightly longer than basomedi-

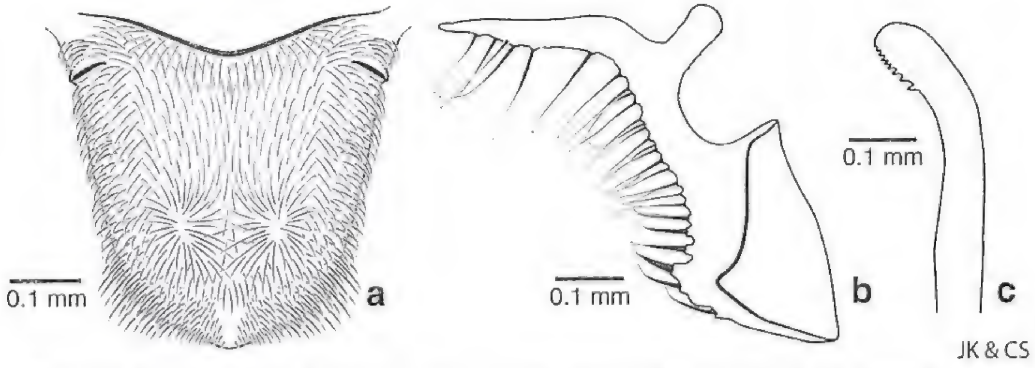

FIGURE 78. *Tachysphex calidus* Pulawski, sp. nov.: a – propodeal dorsum showing typical setal pattern; b – volsella; c – penis valve.

an area; lip free margin arcuate, slightly emarginate mesally, shallowly concave laterally. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 2.7–3.2 × apical width. Forecoxa with short apicomedian process (Fig. 77b). Dorsal foretibial surface with two or three spines, outer surface with three spines. Forebasitarsus with seven or eight rake spines. Tergum V uniformly, densely micropunctate throughout, including apical depression (impunctate and glabrous mesally in some specimens). Pygidial plate aciculate, with minute punctures that average several to many diameters apart. Length 9.8–14.2 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 77c, d): bevel shorter than basomedian area; lip free margin arcuate (inconspicuously emarginate mesally in many specimens), with moderately well-defined corner; distance between corners 0.7–1.0 × distance between corner and orbit (see Geographic Variation below). Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–2.6 × apical width. Forefemoral notch microscopically setose. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II markedly longer than tarsomere III. Length 5.4–9.5 mm. Volsella and penis valve: Figs. 78b, c.

GEOGRAPHIC VARIATION.— Specimens from various geographic areas differ in length of genal setae, extension of setae on the propodeal side, width of the male clypeal lobe, and number of silvery tergal fasciae, as discussed below.

Genal setae. The longest setae of the lower gena (near the meeting point of the occipital and hypostomal carinae) are shorter in specimens from Namibia and South Africa (Fig. 77e, about 0.4 of the basal mandibular width) than in those from Ethiopia, Kenya, Tanzania, and West Africa (Fig. 77f, about 0.3 of the basal mandibular width).

Propodeal side. The propodeal side is glabrous anteriorly except all setose in many West African specimens (setae fine, inconspicuous anteriorly).

Male clypeal lip. The lip is on average narrower in specimens from Namibia and South Africa (distance between lip corners equal to 0.7–0.8 of distance between a corner and nearest orbit) than in specimens from Ethiopia, Kenya, and Tanzania (same ratio equals 0.8–1.0).

Tergal fasciae. Only terga I–III are fasciate apically in specimens from Namibia, Botswana, and South Africa (also female tergum IV or IV and V each has an ill-defined fascia), whereas fasciae are present on terga I–IV in Ethiopian, Kenyan, and West African specimens (female tergum V with ill-defined fascia).

GEOGRAPHIC DISTRIBUTION (Fig. 79).— *Tachysphex calidus* is known from three separate

25 Feb 1996, WJP (1 ♂). **Mariental District**: 65 km S Mariental, 10 Feb 1990, WJP (2 ♂); 71 km E Stampriet, 27 Mar 2000, FSG (1 ♂, AMG); 20 km S Stampriet, 19 Jan 1988, R. Miller and L. Stange (1 ♂, FSCA). **Okahandja District**: Leeu River 9 km W Okahandja, 13 Feb 1996, WJP (2 ♂); 25 km S Okahandja, 14 Mar 1990, WJP (1 ♀, 1 ♂); Waldau River 17 km W Okahandja, 13–14 Feb 1996, WJP (4 ♂). **Omaruru District**: between Omaruru and Wilhelmstal, 3 Apr 1998, FSG (1 ♂, AMG). **Rehoboth District**: 7 km N Rehoboth, 7 Feb 1990, MS (1 ♂, MS). **Windhoek District**: Aris 25 km S Windhoek, 5 Feb 1990, WJP (1 ♀); 30 km E Windhoek, 4 Feb 1990, MS (1 ♂, MS); 8 km S Windhoek, 20 Jan 1988, R. Miller and L. Stange (1 ♂, FSCA). **SENEGAL**: Ndangane, 7 Apr 1988, F. Borgato (2 ♂, FB); 25–35 km S Richard Toll, 14 Aug and 2 Sept 1989, H. van der Valk (2 ♂, ZMAN); Rosso, 13 Feb 1988, AM (1 ♀, 2 ♂, MSNT); Rosso, 4 Dec 1947, collector unknown (1 ♂, KMG); 3 km W Samba Dia = 70 air km W Kaolack, 9 July 1991, WJP (3 ♂); 5 km SW Thiès, 18 July 1991, WJP (1 ♀). **SOUTH AFRICA**: (ISP = M.E. Irwin, E.I Schlinger, and F.D. Parker): **Eastern Cape Province**: Elandsheuwels Farm 40 km W Steytlerville, 18–22 Nov 1999, ISP (1 ♀, USU); Grootrivierberg Range 37 km NW Willowmore, 19–24 Nov 1999, ISP (1 ♂, USU); 6 km N Steytlerville, ISP (3 ♀, USU); 43 km NE Willowmore: Plessierivier, 18–22 Nov 1999, ISP (1 ♀, USU). **Free State**: 30 km N Colesberg at Orange River, 25 Nov 2002, Marek Halada (1 ♂, OÖLM). **Northern Cape Province**: Aggeneys, 9 Nov 1990, R. Miller and L. Stange (1 ♀, 2 ♂, FSCA); Anenous at 29°14.5′S 17°34.7′E, 11–13 Oct 1988, FSG (1 ♀, CSE); Augrabies Falls National Park, 11 Dec 1974, H. Empey (1 ♂, AMG); Kalahari Gemsbok National Park: Nossob at 25°30′S 20°37′E, 3 Nov 1989, M.W. Mansell (5 ♀, 8 ♂, PPRI), Nossob Camp at 25°25′S 20°36′E, 31 Oct–2 Nov 1990, M.W. Mansell (3 ♂, PPRI), 20 km S Nossob Camp, 8 Mar 1990, FSG (1 ♂, AMG); Olifantshoek, 26 Nov 1990, R. Miller and L. Stange (1 ♂, FSCA) and 10 Dec 1978, H. Empey (1 ♂, AMG); Olifantshoek at 27°57′S 22°48′E, 20 Feb 1990, CDE (1 ♀, PPRI) and 26 Nov 1990, R. Miller and L. Stange (2 ♀, 1 ♂, FSCA); Onseepkans, 13 Dec 1974, H. Empey (1 ♂, AMG); Twee Rivieren, M.W. Mansell, 18–29 Oct 1989 at 26°25′S 20°37′E (1 ♂, PPRI) and 29–30 Oct 1990 at 26°28′S 20°37′E (1 ♂, PPRI). **Western Cape Province**: Beaufort West District, Feb 1958, S[outh] A[frican] M[useum Staff] (4 ♂, SAM); Cape of Good Hope Nature Reserve near Olifantbosbaai, 7 Jan 1997, WJP (1 ♂); Ceres: upper sources Olifants River, Dec 1949, S[outh] A[frican] M[useum] Exp[edition] (1 ♀, SAM); 40 km E Clanwilliam: Sevilla, 27–28 Nov 1999, ISP (1 ♂, USU); Dikbome Farm on Merweville-Koup road, Jan 1953, H. Zinn (1 ♂, SAM); Graafwater, 15 Nov 1990, R. Miller and L. Stange (1 ♂, FSCA); Karoo National Park at 32°20′S 22°30′E, CDE, 13 Dec 1988 (1 ♀, 5 ♂, PPRI) and 13 Feb 1991 (1 ♂, PPRI); Karoo National Park: Mountain View, 14 Dec 1988, M.W. Mansell (1 ♀, PPRI); Kliprand 60 km WNW Loeriesfontein, 31 Oct 1999, Marek Halada (1 ♂, OÖLM); S of Lambert's Bay, 28 Oct 1999, M. Snižek (2 ♂, OÖLM); 40 km S Lambert's Bay, 30 Oct 1999, Marek Halada (4 ♂, OÖLM); Matjiesfontein, 14–27 Nov 1928, R.E. Turner (1 ♀, BMNH); Mossel Bay, Jan and Feb 1922, R.E. Turner (2 ♂, BMNH); Pearly Beach, Dec 1958, S[outh] A[frican] M[useum Staff] (4 ♀, 13 ♂, SAM); Swartrivier 7 km NW Prince Albert, 31 Dec 1996, WJP (1 ♂); Wellington: Rooshoek, Dec 1973, P.M.F. Verhoeff (1 ♂, RMNH). **TANZANIA**: **Kilimanjaro Region**: Kisiwani 27 km SE Same, 14 Jan 2003, WJP (1 ♀). **Tanga Region**: 73 km NW Korogwe, Omary S. Haji and WJP, 11–12 July 2001 (1 ♀, 3 ♂), 14–15 July 2001 (1 ♀, 1 ♂), 18 July 2001 (1 ♂), 19–20 July 2001 (5 ♂); 2 km NE Mkomazi, M.A. Prentice, 26 and 29–31 Dec 2002 (2 ♂) and 13 Jan 2003 (1 ♂); same locality, WJP, 29–31 Dec 2002 (1 ♂) and 13 Jan 2003 (1 ♂); Pangani River Camp 86 km NW Korogwe, 19 July 2000, Omary S. Haji and WJP (1 ♀). **YEMEN**: Sanaa, 2 and 3 Jan 1975, K. Vegter (2 ♂, RMNH).

Tachysphex camptopygus Pulawski, sp. nov.

Figures 80–83.

Derivation of name.— *Camptopygus*, a combination of the Greek words *kamptos*, bent, curved; and *pyge*, rump, buttocks. An allusion to the apically downcurved pygidial plate of the female.

Recognition.— *Tachysphex camptopygus*, known only from Namibia, is one of those species in which the convex labrum (protruding beyond the clypeal free margin) and elongate galea (equal to 0.8–0.9 of scape) are combined with a uniformly microsculptured propodeal side. Also, the entire propodeal dorsum is setose, the setae forming a complicated pattern (Fig. 80b): the lateral ones are

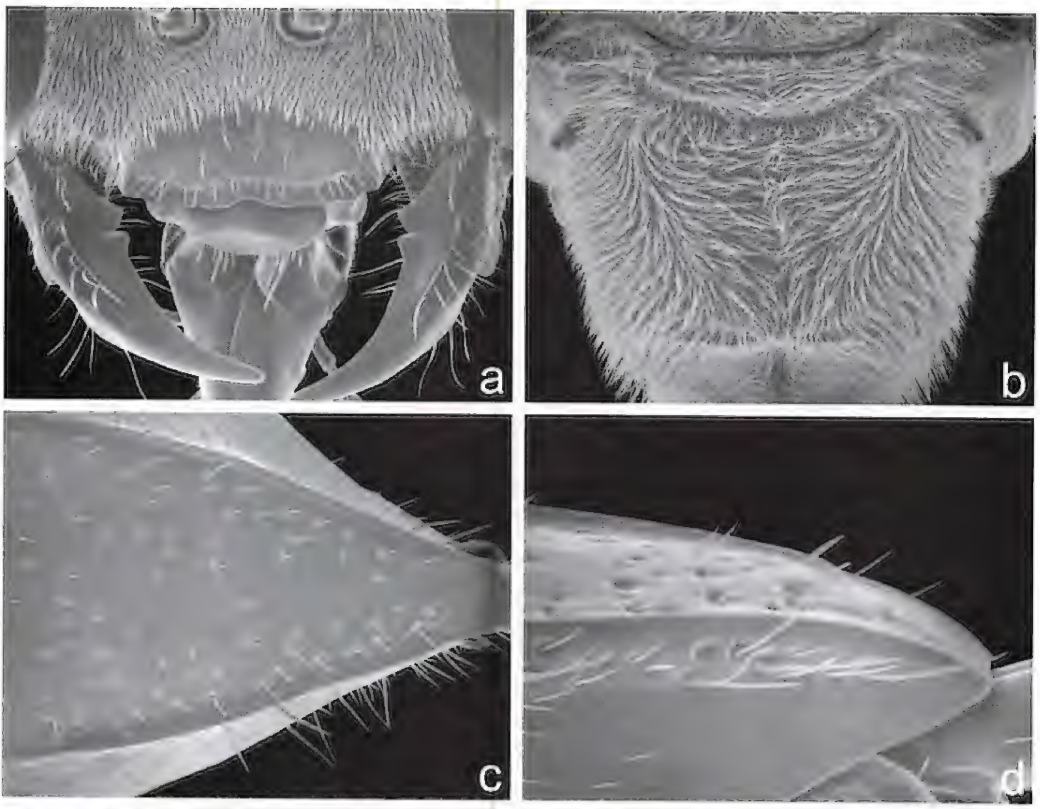

FIGURE 80. *Tachysphex camptopygus* Pulawski, sp. nov.: a – female clypeus and mandible (×39); b – propodeal dorsum of female showing setal pattern (×36); c – pygidial plate of female dorsally (×72); d – same in lateral oblique view (×72).

oriented posterolaterad, the adlateral ones are oriented posteromesad and joining apically, and the central setae are oriented toward the midline (anteromesad anteriorly, posteromesad posteriorly).

The female of *camptopygus* has a distinctive pygidial plate, slightly broader than in similar species and with the apex slightly curving ventrad (Figs. 80c, d), as in *ruber*. Additional recognition features are: setae almost entirely concealing integument of scutum but not of mesopleuron, femora and gaster all or largely red, and apical depression of tergum V impunctate and asetose.

The male is characterized by a black gaster (apex reddish in many specimens) and a broad, relatively short clypeal lobe (Fig. 81a) whose maximum length equals 0.7–0.8 of the distance between the corners: the corners are further apart from each other than from the respective orbit. The most significant recognition feature, the shape of the trimmal carina, can be seen only when the mandibles are open: the distal margin of the tooth forms a right to obtuse angle with the remaining mandibular margin (Fig. 81a), and the trimmal carina is obtuse distad of tooth (but contrastingly sharp near apex). A similar mandible is found in *sahelensis* and *taita*, but the male of *camptopygus* has a well-developed foretarsal rake (rake absent in *sahelensis*), sternum VIII tridentate apically or with a median, obtuse prominence (sternum VIII simple between lateral prongs in the other two species), and gaster all black (red basally in *taita*). The reddish labrum and contrastingly black clypeus are subsidiary recognition characters of *camptopygus*.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, with minute punctures that are several diameters apart; length equal to 0.8 of scape in female, 0.9

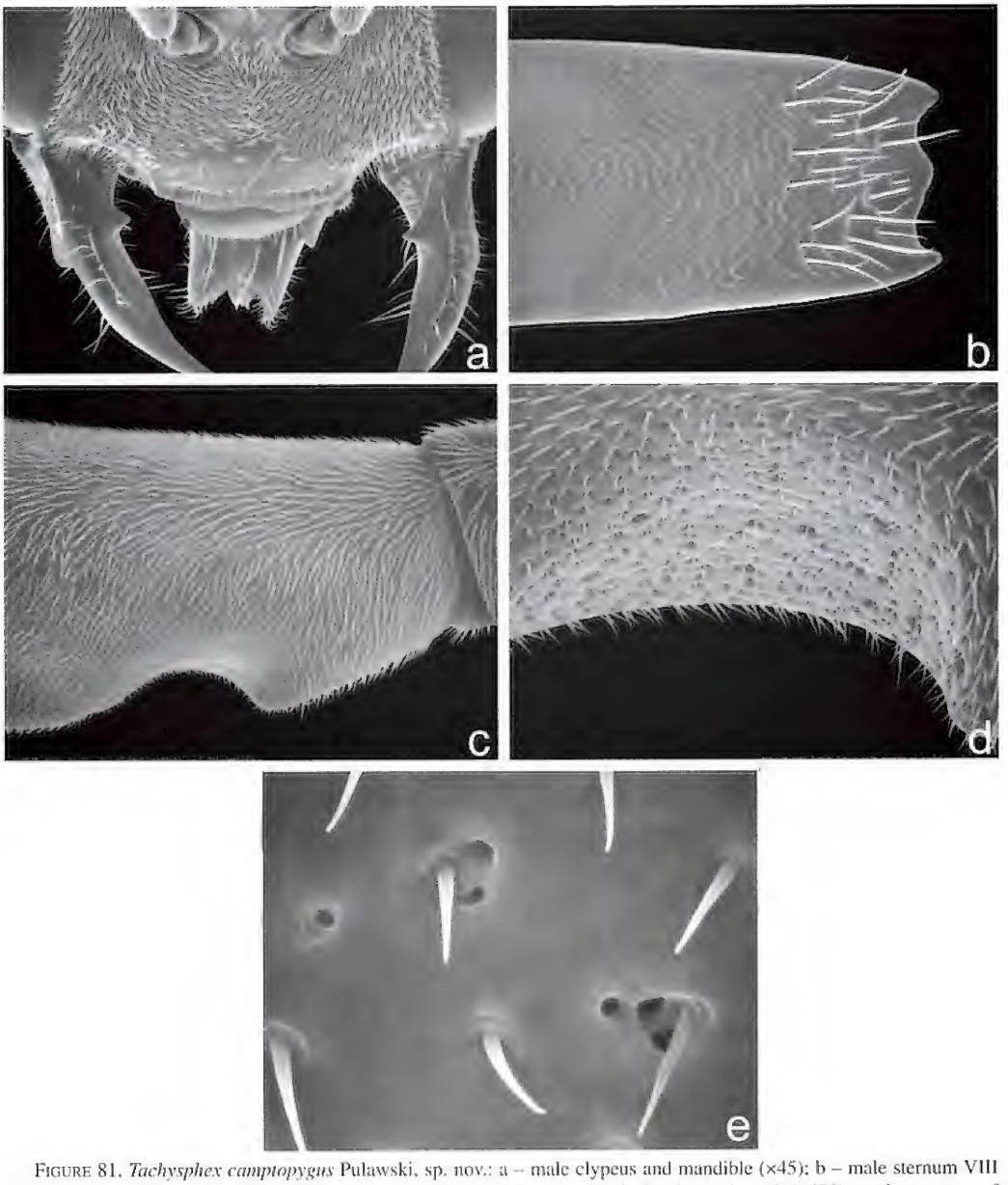

FIGURE 81. *Tachysphex camptopygus* Pulawski, sp. nov.: a – male clypeus and mandible (×45); b – male sternum VIII (×180); c – base of male forefemur showing notch (×120); d – bottom of male forefemoral notch (×420); e – integument of male forefemoral notch showing pores (×4200).

in male. Scutal punctures minute, ill defined, less than one diameter apart. Mesopleuron microsculptured. Propodeal dorsum and side evenly microsculptured, not ridged (side with minute, short ridges next to metapleural suture in some females); posterior surface ridged in most specimens, but ridges evanescent or absent in some. Hindcoxal dorsum with inner margin carinate basally.

Setae nearly appressed on each side of oral fossa next to occipital carina, appressed on posto-

cellar area and scutum, largely obscuring scutal integument in female; lateral setae of propodeal dorsum oriented posterolaterad, adlateral setae oriented posteromesad and joining apically (Fig. 80b), admedian setae oriented toward midline (anteromesad anteriorly, posteromesad posteriorly).

Head and thorax black, mandible (except apically) and labrum yellowish red, also clypeal bevel in female; pronotal lobe yellowish posteriorly in some females. Frontal setae with golden tinge in females and smallest males, golden in most males. Wing membrane almost hyaline; forewing costal vein yellowish, subcostal vein brown. Color of legs and gaster: see below. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 80a): bevel longer than basomedian area; lip free margin arcuate, with or without median emargination, laterally incised or entire. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.2–2.3 × apical width. Dorsal foretibial surface with two or three spines, outer surface with two or three spines. Forebasitarsus with eight or nine rake spines. Apical depression of tergum V impunctate, asetose. Pygidial plate shiny, with well-defined punctures that range from less than one to many diameters apart, with apex slightly broader than in most other species, truncate or nearly so, and slightly curving ventrad (Figs. 80c, d). Length 8.9–10.7 mm. Femora all red or with black dorsum, black both basally and dorsally in some specimens. Tibiae and tarsi red. Gaster red or terga with irregular, black spots.

♂.— Mandible: trimmal carina with asymmetrical tooth (Fig. 81a) whose proximal margin is regularly curved and distal margin contrastingly straight (forming right to obtuse angle with remaining mandibular margin), obtuse distad of tooth, but contrastingly sharp preapically. Clypeus (Fig. 81a): bevel longer than basomedian area; lip free margin almost straight except emarginate mesally, corner not prominent; distance between corners 1.3–1.4 × distance between corner and orbit. Width of postocellar area 0.6–0.8 × length. Dorsal length of flagellomere I 1.8–1.9 × apical width. Forefemoral notch with microscopic, erect setae (Figs. 81c–e) and minute pores that are visible only under high magnifications (Fig. 81e). Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Punctures of tergum VII, in some specimens, several diameters apart mesally. Sternum VIII tridentate (Fig. 81b) or middle tooth reduced to broad, round projection. Length 5.5–8.6 mm. Volsella and penis valve: Fig. 82. Femora and gaster black or tergum VII and sternum VIII red. Tibiae and tarsi red or midtibia partly and hindtibia largely darkened.

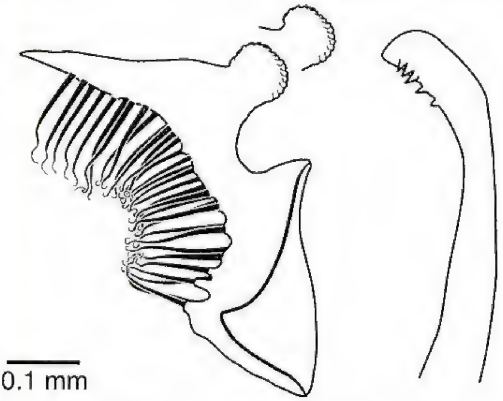

FIGURE 82. *Tachysphex camptopygus* Pulawski, sp. nov.: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 83).— Namibia.

RECORDS.— HOLOTYPE: ♀, **NAMIBIA**: **Karibib District**: Khan River 23 km N Karibib, 20–21 Feb 1996, WJP (CAS). PARATYPES: **NAMIBIA**: **Gobabis District**: 40 km W Witvlei, 16 Feb 1990, WJP (3 ♂). **Grootfontein District**: 40 km NE Grootfontein, 16 Jan 1993, MS (1 ♀, MS). **Karasburg District**: Warmbad: Koanoveld, Feb 1925, [South African] Museum Expedition (1 ♂, SAM). **Karibib District**: Ameib Farm 19 mi NW Karibib, 31 Jan–2 Feb 1972, [British Museum] Southern African Expedition (1 ♂, BMNH); 43 km E Karibib, 20 Feb 1990, MS (3 ♀, 12 ♂, MS), WJP (1 ♀, 6 ♂); 50 km E Karibib, 9 Feb 1993, MS (1 ♂, MS); 62 km E Karibib, 20 Feb 1990, MS (1 ♀, MS), WJP (2 ♀); 15 km W Karibib, 26 Feb 1990, WJP (1 ♂); Khan River 23 km N Karibib, 20–21 Feb 1996, WJP (12 ♀, 5 ♂); Khan River 5 mi N Usakos, 30–31 Jan 1972, [British Museum] Southern African Expedition (2 ♀, BMNH); 55 km SW Usakos, 25 Feb 1990, MS (1 ♂, MS); 12–18 km W Usakos,

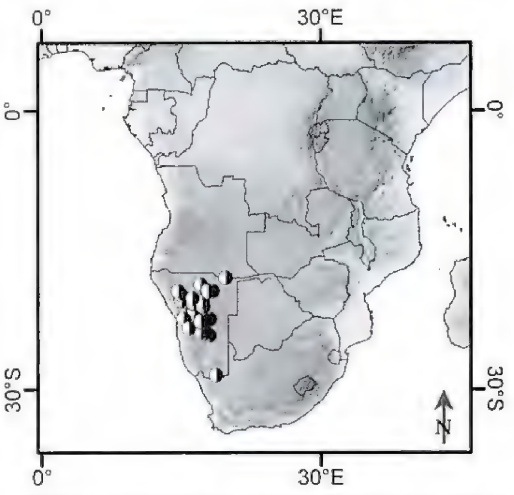

FIGURE 83. Collecting localities of *Tachysphex camptopygus*.

5 Mar 1977, J.G. Rozen (1 ♀, AMNH). **Khorixas District**: 4 km E Khorixas, 25 Feb 1996, WJP (1 ♂). **Mariental District**: Onze Rust 192 [Farm], 17–18 May 1973, C. Jacot-Guillarmod (1 ♀, AMG). **Okahandja District**: Leeu River 9 km W Okahandja, WJP, 13 Feb 1996 (1 ♀, 45 ♂) and 3 Dec 1996 (1 ♂); Okahandja, H. Empey, 27 Dec 1977 (4 ♂, AMG) and 29 Dec 1978 (1 ♂, AMG); Okahandja, 2–4 Feb 1972, [British Museum] Southern African Expedition (2 ♀, 1 ♂, BMNH); Waldau River 17 km W Okahandja, 19 Feb 1990, MS (1 ♀, 1 ♂, MS), WJP (1 ♂); same locality, WJP, 13–14 Feb 1996 (2 ♂) and 12 Dec 1996 (1 ♂). **Omaruru District**: Otjikoko Süd Farm 33 mi ENE Omaruru, 10–13 Feb 1972, [British Museum] Southern African Expedition (1 ♀, 2 ♂, BMNH); Otjikoko-Süd 61 [Farm, 40 km ESE Omaruru], 10–13 Feb 1972, collector unknown (2 ♀, NMN). **Otjiwarongo District**: 18 km NE Kalkfeld, 22 Feb 1996, WJP (1 ♀, 2 ♂); 25 km NE Kalkfeld, 27 Feb 1996, WJP (1 ♂); Osire, 24 Dec 1974, H. Empey (1 ♂, AMG); Waterberg, 23 Dec 1995, C. Schmidt-Egger (1 ♂, CSE). **Outjo District**: 5 km S Kamanjab, 24 Feb 1996, WJP (2 ♂); 31 km SE Kamanjab, 5 Mar 1990, MS (13 ♂, MS), WJP (2 ♀, 2 ♂); Kaross Farm, Feb 1925, [South African] Museum Expedition (1 ♂, SAM); Ugab River 12 km SE Outjo, 23 Feb 1996, WJP (1 ♀, 1 ♂). **Rehoboth District**: 15 km N Kalkrand, 13 Feb 1990, MS (3 ♀, 10 ♂, MS), WJP (2 ♀, 22 ♂); same locality, 14 Feb 1990, MS (2 ♀, 7 ♂, MS); 27 km N Kalkrand, 18 Feb 1990, WJP (2 ♂); 23 km N Rehoboth, 6 Feb 1990, MS (3 ♂, MS), WJP (12 ♂); same locality, 15 Feb 1990, MS (2 ♂, MS), WJP (4 ♂); same locality, 17 Feb 1990, MS (2 ♂, MS), WJP (8 ♂); same locality, 16 Mar 1990, WJP (1 ♂); 9 km S Rehoboth, 8 Feb 1990, MS (1 ♀, 7 ♂, MS), WJP (8 ♂); same locality, 14 Feb 1990, MS (1 ♀, 14 ♂, MS), WJP (1 ♂); same locality, 16 Mar 1990, WJP (1 ♂); 49 km S Rehoboth, 9 Feb 1990, MS (1 ♂, MS); same locality, 14 Feb 1990, WJP (3 ♂). **Rundu District**: Rundu, 18 Jan 1993, J. Gusenleitner (1 ♀, MS), MS (2 ♀, MS); same locality, MS, 20 Jan 1993 (1 ♂, MS). **Swakopmund District**: between Kuiseb and Gaub passes at 23°24′S 15°50′E, date unknown, FSG (1 ♀, 1 ♂, AMG). **Tsumeb District**: Onguma Farm 55 mi NW Tsumeb, 17–19 Feb 1972, [British Museum] Southern African Expedition (1 ♂, BMNH); 10 km SE Tsumeb, 8 Mar 1990, MS (3 ♂, MS); 25 km SE Tsumeb, 15 Jan 1993, J. Gusenleitner (1 ♀, MS). **Windhoek District**: 2 km S Aris, 15 Feb 1990, WJP (2 ♂); Bismarck River 30 km E Windhoek, 4 Feb 1990, WJP (5 ♂); 4 km ESE Seeis, 16 Feb 1977, J.G. and B.L. Rozen (1 ♂, AMNH); Windhoek, 20 Dec 1974, H. Empey (1 ♂, AMG); Windhoek, 30 Dec 1983, R. Oberprieler (3 ♂, PPRI); 36 km E Windhoek, 16 Feb 1990, MS (5 ♂, MS), WJP (1 ♀, 1 ♂); 8 km S Windhoek, 10 Jan 1988, R. Miller and L. Stange (2 ♂, FSCA).

Tachysphex capensis (de Saussure)

Figures 84–87.

Tachytes capensis de Saussure, 1867:71, ♂. Lectotype: ♂, South Africa: Western Cape Province: Cape of Good Hope: no specific locality (NHMW), **here designated**, examined.— Kohl, 1885:400 (listed).— As *Tachysphex capensis*: Dalla Torre, 1897:678 (new combination, in catalog of world Hymenoptera); Arnold, 1923a:174 (listed); Bohart and Menke, 1976:273 (listed); Dollfuss, 1989:13 (type in NHMW).

Tachysphex tuckeri Arnold, 1923:172, ♂ (as *Tuckeri*, incorrect original capitalization). Holotype: ♂, South Africa: Western Cape Province: Montagu (SAM), examined. **New synonym.**— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed).

RECOGNITION.— *Tachysphex capensis* can be recognized by the sparsely punctate posteroventral surface of the fore- and midfemora (Fig. 85b), in combination with the dark brown thoracic

vestiture. In the female, black frontal and clypeal setae are also distinctive. The following also help in identification: setae of propodeal dorsum erect or oriented posterad, terga not fasciate, female trochanteral venters almost impunctate on all legs, and male sterna III–VI with suberect setae.

Justification of new synonymy.— The lectotype of *capensis* and the holotype of *tuckeri* are certainly conspecific. These two names are therefore synonyms.

Description.— Scutal punctures sexually dimorphic (see below). Mesopleural punctures minute, several diameters apart (except anteriorly), interspaces microsculptured, dull. Punctures of mesothoracic venter varying, averaging 2–3 to several diameters apart. Episternal sulcus complete. Propodeal dorsum all or partly ridged or rugose, remainder uniformly microsculptured; side ridged (coarsely to minutely so) except ridges evanescent or effaced along metapleuron. Hindcoxal dorsum with inner margin carinate basally.

Setae nearly appressed, shorter than midocellar diameter on postocellar area and scutum; suberect, equal to about 0.3 of basal mandibular width on each side of oral fossa next to occipital carina; erect or slightly inclined posterad on propodeal dorsum.

Head and thorax black, mandible all black or reddish mesally. Frontal and clypeal setae black in female, golden in male. Wing membrane infumate, slightly so in many males; forewing costal vein red brown, subcostal vein dark brown. Femora black, color of tibiae sexually variable (see below). Gastral segments I–III red in most specimens (I–IV in some males), reddish in one male from Het Kruis; remaining segments black (reddish brown in a male from Goegap area); but all gaster black in single female from Pakhuis Pass, one from Leipoldtville area, and a male from Mowers. Thoracic setae dark brown. Terga without silvery, apical fasciae.

♀.— Labrum shallowly emarginate mesally. Clypeus (Fig. 84a): bevel about as long as basomedian area to markedly longer, with several large, conspicuous punctures; lip free margin arcuate, with one or two lateral incisions on each side. Width of postocellar area 1.0–1.3 × length. Dorsal length of flagellomere I 2.6–2.8 × apical width. Scutum: discal punctures varying from about 1–2 to many diameters apart. Trochanteral venters (on all legs) shiny, with a few, sparse punctures. Fore- and midfemoral venters and posteroventral surfaces with large, sparse punctures (Fig. 85b); interspaces unsculptured, shiny, to dull, uniformly microsculptured. Dorsal foretibial surface with three to five spines, outer surface asetose, with several spines; midtibial dorsal surface asetose between spines. Forebasitarsus with 15–18 rake spines. Length of hindtarsomeres IV about equal to width; hindtarsomeres V and claws somewhat elongate (Fig. 85c), venter with several long, erect setae, apicoventral margin slightly arcuate (Fig. 85d). Tergum V: punctures averaging many diameters apart, apical depression impunctate. Pygidial plate rounded apically (Fig. 85a). Length

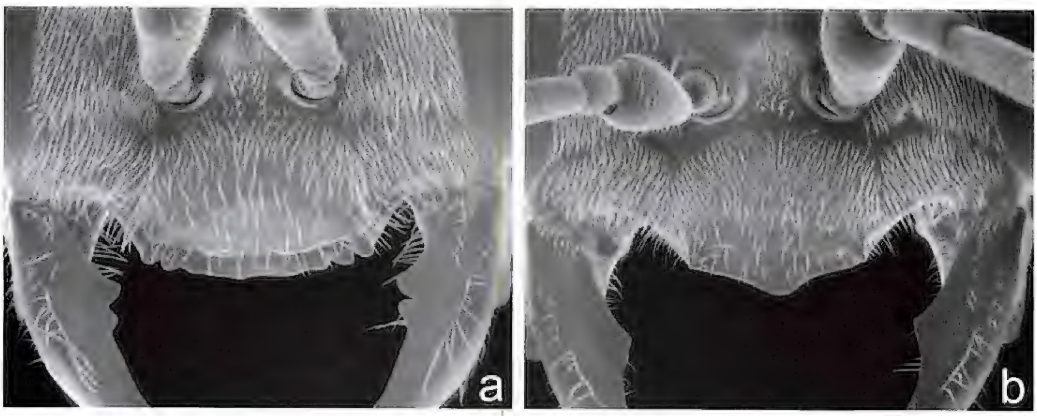

Figure 84. *Tachysphex capensis* (de Saussure): a – female clypeus (×28); b – male clypeus (×36).

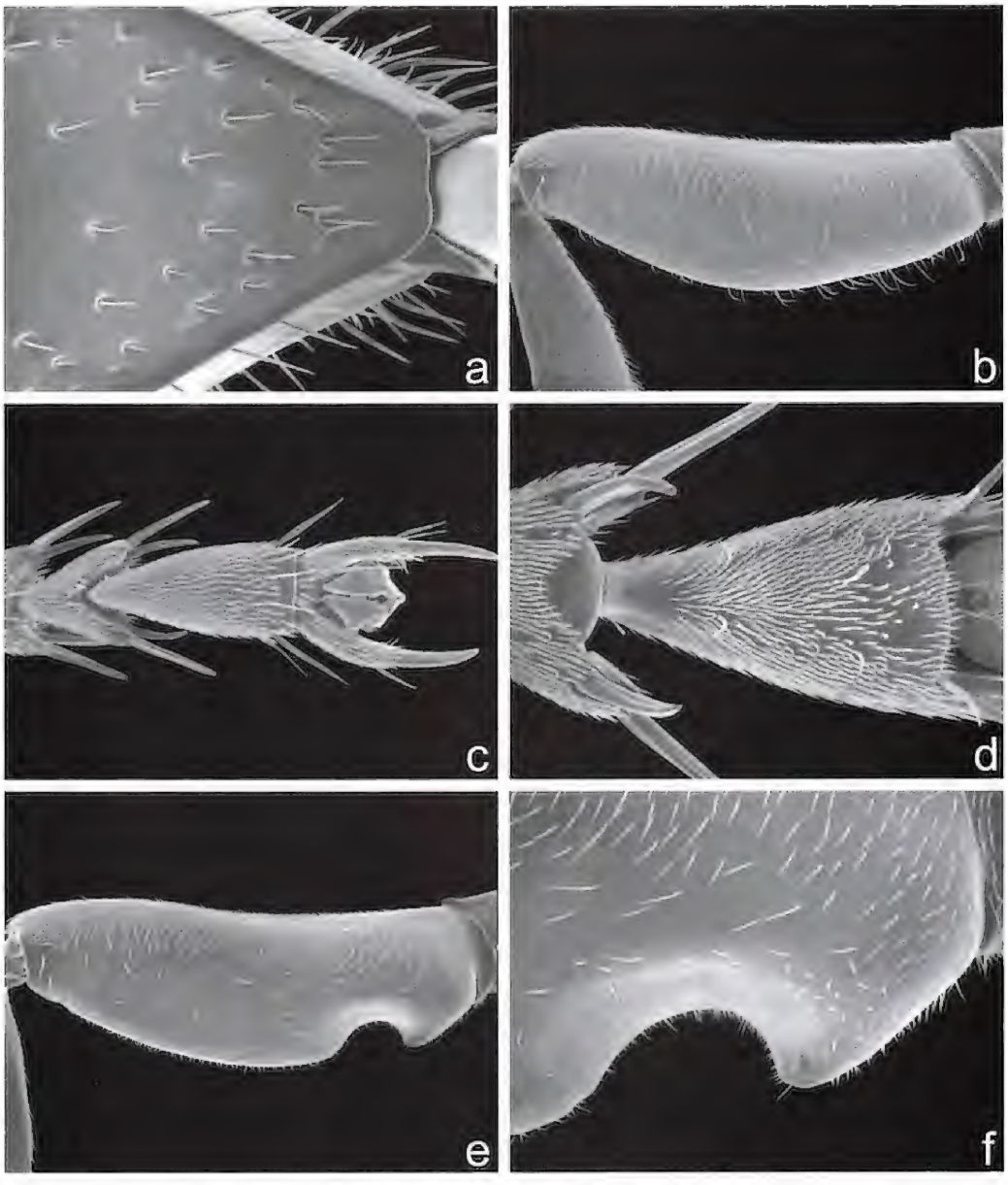

FIGURE 85. *Tachysphex capensis* (de Saussure): a – pygidial plate of female (×90); b – female forefemur, posterior view (×30); c – female hindtarsomeres IV and V dorsally (×45); d – female hindtarsomere V ventrally (×120); e – male forefemur, posterior view (×40); f – base of male forefemur showing notch (×120).

12.5–14.0 mm. Foretibia all black to largely red; mid- and hindtibiae black or midtibia partly red.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 84b): bevel about as long as basomedian area; lip free margin arcuate, mostly with small, prominent projection mesally, with well-defined corner; distance between corners 0.9 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–2.6 × apical width. Scutum:

discal punctures averaging 1–2 diameters apart, with several punctures up to 4–5 diameters apart in most specimens. Posterior surface of fore- and midfemora with all or most punctures several to many diameters apart; forefemoral notch setose (Figs. 85e, f). Outer margin of forebasitarsus without preapical spines or with one such spine next to apical one; outer apical spine of foretarsomere II shorter than tarsomere III. Sternal punctures becoming larger toward gastral apex, sterna III–VI with suberect setae whose length is up to 0.3 × basal mandibular width. Length 9.4–13.1 mm. Volsella and penis valve: Fig. 86. Fore- and midtibiae all red or foretibial outer surface and midtibia largely black; hindtibia varying from all black to largely red.

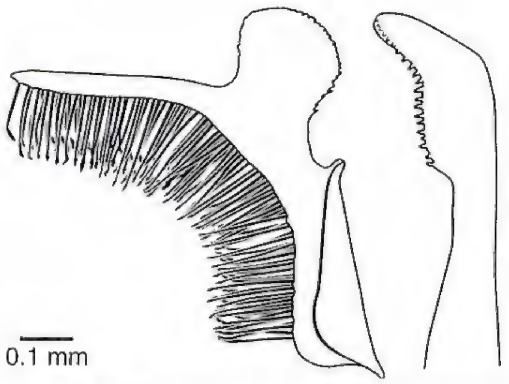

FIGURE 86. *Tachysphex capensis* (de Saussure): volsella and penis valve.

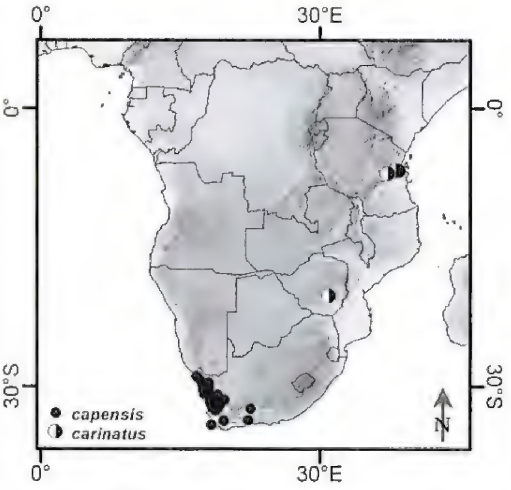

FIGURE 87. Collecting localities of *Tachysphex capensis* and *carinatus*.

GEOGRAPHIC DISTRIBUTION (Fig. 87).— Namaqualand and southwestern South Africa).

RECORDS.— **SOUTH AFRICA**: **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♂, PPRI), Bouwesdorp in Namaqualand (1 ♂, SAM), Calvinia: Augustusfontein (1 ♂; 1 ♀, 1 ♂, SAM), W Calvinia (1 ♂, OÖLM), Dassiefontein Farm (1 ♀, 2 ♂, PPRI), Droë River in Namaqualand (1 ♂, SAM), Garies (1 ♀, 1 ♂; 1 ♀, 3 ♂, AEI), 9 km S Garies (1 ♂, SAM), Goegap Nature Reserve (1 ♂; 8 ♂, AMG; 2 ♂, PPRI), Goegap Nature Reserve: near Kraaiwater at 29°37′S 18°00′E (1 ♂; 4 ♂, AMG) and windmill at 29°37′S 17°59′E (4 ♂, AMG), Groen River 40 km SW Garies (1 ♂; 2 ♂, OÖLM), Groenriviersmond (10 ♂, OÖLM), 25 km E Hondeklipbaai (2 ♀; 2 ♀, 5 ♂, OÖLM), Kamieskroon (4 ♂, SAM), 50 km W Loeriesfontein (2 ♂; 3 ♂, OÖLM), Nariep (1 ♂, AEI), Nieuwoudtville: Skuinshoogte Pass at 31°16′S 19°08′E (2 ♂; 7 ♂, AMG), 23 km E Port Nolloth at 29°18.3′S 17°06.3′E (1 ♂), 40 km N Port Nolloth at 28°54.3′S 16°44.3′E (1 ♀, 3 ♂), Taaiboskraal/ Anegas at 30°07′S 18°01′E (1 ♂, AMG), Voëlklip at 29°45′S 17°22′E (2 ♂, AMG), Wallekraal (1 ♂, SAM), 7 km NW Wallekraal (1 ♀, AMG). **Western Cape Province**: Botterkloof Pass 56 km NE Clanwilliam at 31°48′46″S 19°15′14″E (1 ♂, CSE), Bulshoek between Klawer and Clanwilliam (2 ♀, SAM), Cape of Good Hope (1 ♂, NHMW, lectotype of *capensis*), Citrusdal to Clanwilliam (1 ♀, 1 ♂, SAM), 5 km S Clanwilliam at 32°11.4′S 18°52.5′E (1 ♀, 3 ♂), 11 km W Clanwilliam (1 ♂, SAM), Doringbos (2 ♂, OÖLM), Het Kruis (1 ♀, 3 ♂, SAM), Knersvlakte 20 km N Vanrhynsdorp at 31°26.4′S 18°41.8′E (1 ♂) and 48 km N Vanrhynsdorp at 31°14′S 18°32′E (3 ♂, AMG), Lambert's Bay at 32°04′S 18°20′E (1 ♂; 2 ♂, PPRI), S Lambert's Bay (3 ♂, OÖLM), Leipoldtville to Eland's Bay (1 ♀, 2 ♂; 3 ♂, SAM), Montagu (2 ♂, including holotype of *tuckeri*, SAM), Mowers in Robertson District (1 ♂, SAM), Oudtshoorn-Zebra (1 ♂, SAM), Pakhuis Pass (3 ♂; 1 ♀, 7 ♂, UCD), E Pakhuis Pass (1 ♂, SAM), Paleisheuwel (1 ♂; 3 ♂, SAM), Papendorp at Olifantsriver (1 ♀; 1 ♀, SAM), Vanrhynsdorp (2 ♂, TMP), 30 km NE Vanrhynsdorp at 31°26.7′S 18°58.4′E (4 ♀, 2 ♂; 2 ♀, 2 ♂, JS).

***Tachysphex carinatus* Pulawski, sp. nov.**
Figures 87, 88.

Derivation of name.— The name *carinatus* refers to the conspicuously carinate sternum I, the main recognition character of this species.

Recognition.— *Tachysphex carinatus* is unique in having a markedly prominent median carina on sternum I (Fig. 88c). Subsidiary recognition features are: supraantennal swelling densely punctate (almost like the adjacent frons), clypeal bevel ill defined to absent, tarsi shortened (length of midtarsomere III about 1.0 × apical width in female and 1.2 × in male), and in the female flagellomeres III–X flattened laterally and with characteristic sensory areas and the pygidial plate punctatorugose.

Description.— Labrum slightly convex, slightly protruding from beneath clypeus. Galea shiny, sparsely punctate, slightly longer than wide, as long as 0.6 of scape. Supraantennal swelling densely, uniformly punctate and setose, almost like adjacent frons. Scutal and mesopleural punctures well defined, one diameter or less apart; interspaces shiny. Propodeal dorsum rugose, in some specimens also with irregular, longitudinal ridges; side coarsely rugose or longitudinally ridged. Hindcoxal dorsum with inner margin carinate, carina somewhat expanded basally. Sternum I with

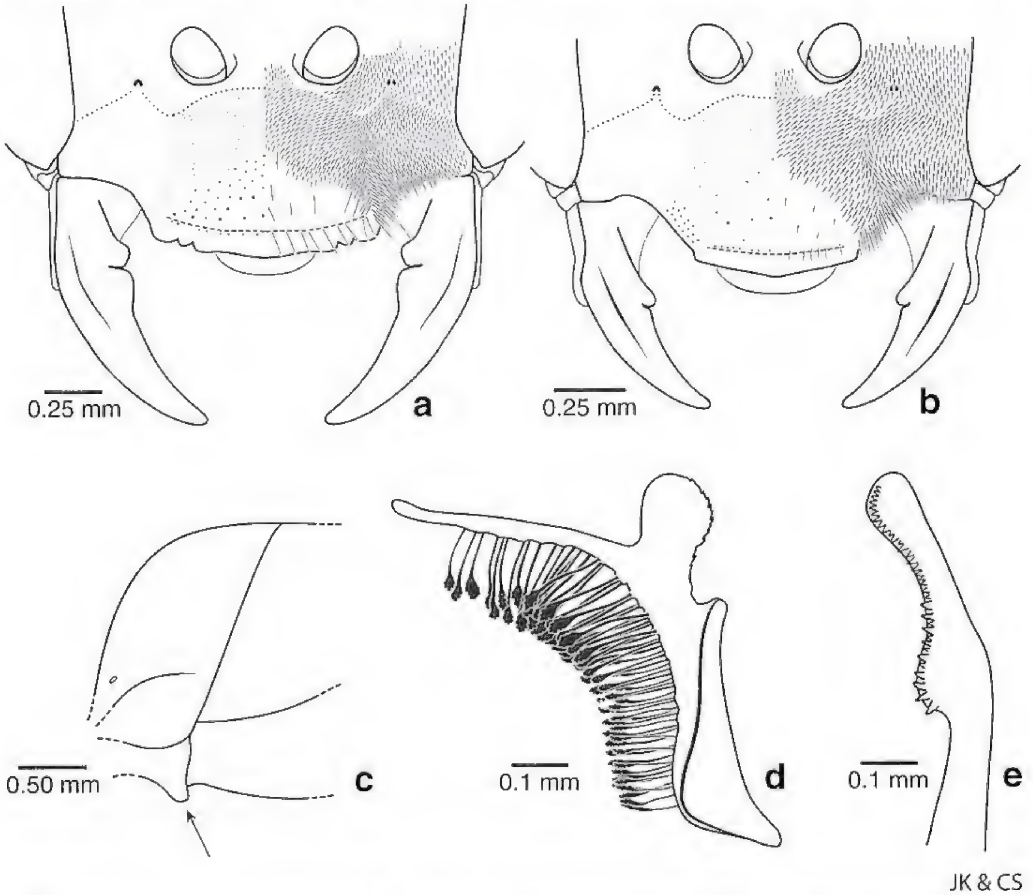

Figure 88. *Tachysphex carinatus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – gastral base; d – volsella; e – penis valve.

longitudinal carina that is conspicuously prominent apically (Fig. 88c).

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; most setae on propodeal dorsum oriented obliquely anterad, but lateral setae oriented posterad and joining apicomesally.

Head and thorax black, mandible either all black or dark reddish preapically. Frontal setae silvery in both sexes. Wing membrane yellowish brown; costal vein of forewing reddish brown, subcostal vein dark brown. Femora, tibiae, and tarsi black in most specimens (hindtibia reddish basally in some), but all tibiae and tarsi red in male from 17 km E Chalinze (except inner surface of foretibia black), and hindfemur apically and all tibiae and tarsi red in single female from Zimbabwe. Gastral segments I–III mostly red, but gaster all black in some males. Terga I–III silvery fasciate apically (fasciae golden in female from Zimbabwe).

♀.— Clypeus (Fig. 88a): bevel not differentiated, median section finely punctate and with several larger punctures in ventral half; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.2 × length. Dorsal length of flagellomere I 1.6 × apical width; flagellomeres III–X flattened laterally, with characteristic sensory areas. Dorsal foretibial surface with a few inconspicuous bristles, outer surface with two fine bristles, its punctures and setae less dense than on remaining surface. Tarsi short: length of fore- and midtarsomeres II about 1.3 and 1.4 × apical width, respectively; of midtarsomere III 1.0 apical width; of fore-, mid-, and hindtarsomere IV about 1.0, 0.9, and 1.0 × apical width, respectively. Forebasitarsus with nine or ten rake spines. Apical depression of tergum V densely punctate except unsculptured along posterior margin. Pygidial plate punctatorugose, its apex truncate. Length 9.3–10.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 88b): bevel rudimentary or not differentiated, middle clypeal section finely punctate, in ventral half also with several larger punctures; lip free margin arcuate, with well-defined corner; distance between corners 1.1–1.2 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.1–1.2 × apical width, equal to 0.7 of II. Forefemoral notch with microscopically setose bottom. Length of midtarsomeres II and III 1.7–1.8 and 1.2 × apical width, respectively. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Sternum VIII tridentate apically. Length 7.5–9.2 mm. Volsella and penis valve: Figs. 88d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 87).— Tanzania to Zimbabwe.

RECORDS.— HOLOTYPE: ♀, **TANZANIA: Coast Region**: 17 km E Chalinze at 6°39.2′S 38°30.2′E, 21 July 2001, Omary S. Haji and WJP (CAS). PARATYPES: **TANZANIA: Coast Region**: 17 km E Chalinze, 28 June 2001, M.H. Bourbin and WJP (1 ♂); 60 km ENE Morogoro, 14 June 2001, M.H. Bourbin and WJP (1 ♂). **Morogoro Region**: 48 km W Morogoro, M.H. Bourbin and WJP, 6 June 2001 (1 ♂), 11 June 2001 (1 ♂), 18 June 2001 (3 ♂); same locality, Omary S. Haji and WJP, 2–3 July (1 ♂) and 7 July 2001 (1 ♂); 60 road km SW Morogoro, 5 June 2001, M.H. Bourbin and WJP (1 ♂). **ZIMBABWE**: Lake Kyle Recreational Park [shore of Lake Mutirikwi near Masvingo], 16 Apr 1985, J. Gusenleitner (1 ♀).

***Tachysphex cavatus* Pulawski, sp. nov.**
Figures 89, 90.

DERIVATION OF NAME.— *Cavatus*, Latin masculine adjective meaning hollow or arched inward; with reference to the unusual scutellum of this species.

RECOGNITION.— *Tachysphex cavatus*, an endemic of Madagascar, is instantly recognized by its unique, thickened and raised scutal flange and deeply sunken lateral scutellar portion (Figs. 89b, c). The short but conspicuous longitudinal ridges next to the scutal hindmargin help in recognition.

DESCRIPTION (based on male only).— Supraantennal swelling lower than average for the

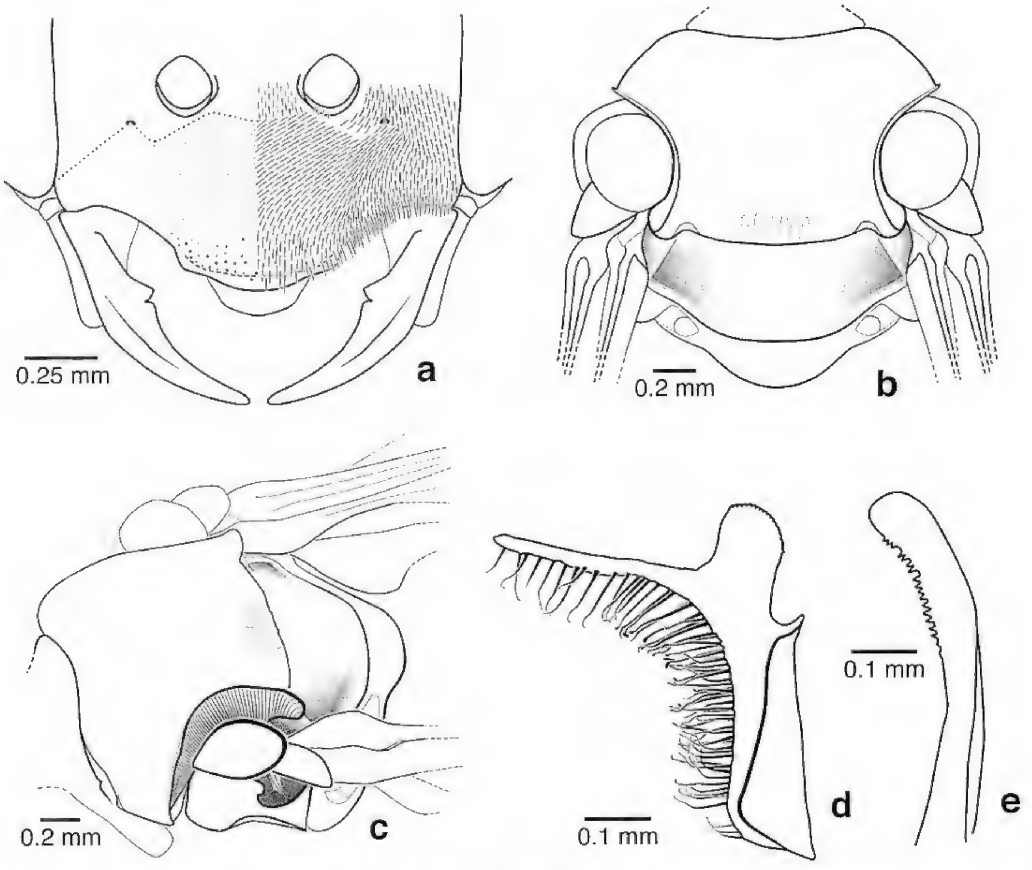

FIGURE 89. *Tachysphex cavatus* Pulawski, sp. nov.: a – male clypeus and mandible; b – male thorax in dorsal view; c – male thorax in lateral oblique view; d – volsella; e – penis valve.

genus, finely, uniformly microsculptured, dull, but asetose and thus contrasting with surrounding surface. Scutal and mesopleural punctures well defined, conspicuous, less than one diameter apart; interspaces unsculptured, shiny. Scutum with several short but conspicuous, longitudinal ridges next to hindmargin; scutal flange becoming raised and unusually thick posterad, its apex protruding beyond scutal hindmargin (Figs. 89b, c). Scutellar lateral area and axillar posterolateral surface conspicuously, deeply sunken (Figs. 89b, c). Mesopleural flange expanded, subalar fossa deeper than in most other *Tachysphex*. Propodeal dorsum rugose and at least partly ridged; side punctate (interspaces confluent into ill-defined ridges), ridged anteriorly. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, suberect on scutum, no longer than midocellar diameter; about 0.5 × basal mandibular width on each side of oral fossa next to occipital carina; on propodeal dorsum diverging obliquely anterad from midline.

Head, thorax, gaster and legs black, mandible reddish preapically. Frontal setae silvery. Wing membrane slightly infumate; costal and subcostal veins of forewing black. Terga I–IV silvery fasciate apically.

♀.— Unknown.

♂.— Mandible: trimmal carina with tooth and cleft (Fig. 89a). Clypeus (Fig. 89a): bevel not differentiated, clypeal middle section setose to lip base; lip free margin evenly arcuate, with well-defined corner; distance between corners equal to that between corner and orbit. Width of postocellar area 2.0–2.2 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width. Forefemoral notch with microscopically setose bottom. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Venter of tarsomeres V with one preapical spine. Sternal punctures well defined. Apical margin of sternum VIII with median projection. Length 7.6–8.1 mm. Volsella and penis valve: Figs. 89d, e.

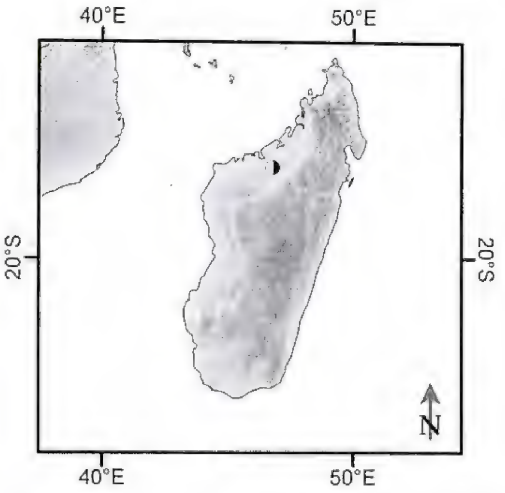

FIGURE 90. Collecting locality of *Tachysphex cavatus* and *ampijoroa*

GEOGRAPHIC DISTRIBUTION (Fig. 90).— Madagascar.

RECORDS.— HOLOTYPE: ♂. **MADAGASCAR**: **Mahajanga Province**: Parc National d'Ankarafantsika: Ampijoroa Station Forestière 40 km NW Andranofasika at 16°19′15″S 46°48′38″E, 26 March–1 Apr 2001, B. Fisher, Ch. Griswold, et al. (CAS). PARATYPES: same data as holotype (3 ♂), same data but 18.3 km NE Tsaramandroso at 16°13′41″S 46°08′37″E, 2–8 Apr 2001 (1 ♂).

Tachysphex cheops de Beaumont

Figures 91, 92.

Tachysphex cheops de Beaumont, 1940:163, ♀, ♂. Holotype: ♀, Egypt: Cairo-Suez road (originally A. Mochi collection, now Entomological Society of Egypt[?]), not examined.— Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:158 (in revision of Egyptian *Tachysphex*), 1950b:17 (Egypt), 1953a:175 (Mauritania), 1966:212 (Egypt); Pulawski, 1971:291 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:10 (Israel); Bohart and Menke, 1976:273 (listed); Krombein and Pulawski, 1994:64 (Pakistan); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

As *Tachysphex panzeri*: Guiglia, 1940:289, fig. 1 (Libya), corrected to *Tachysphex cheops* by Pulawski, 1971:291.

RECOGNITION.— *Tachysphex cheops* has the labrum markedly convex and protruding beyond the clypeal free margin (Figs. 91a, b), galea about as long as the scape, the propodeal side uniformly microsculptured (not ridged), and the setae of lower gena suberect but not sinuous, those adjacent to the hypostomal carina markedly longer than the midocellar diameter (0.3–0.4 × basal mandibular width). It differs from other such species in having the free margin of the lateral clypeal lobe only shallowly concave (Figs. 91a, b), the trimmal carina in the female with an unusually low subbasal teeth (Fig. 91a), the male clypeus with an oblique carina emerging from each lip corner but not extending beyond the lip itself, and the bevel shorter than basomedian area to nearly reduced. Subsidiary recognition features include: setae, next to occipital carina on each side of the carina's dorsal midpoint, suberect and longer than midocellar diameter; propodeal side setose throughout (also setose in many West African *calidus*, but setae fine and inconspicuous anteriorly); female tergum V sculptured and setose throughout; and male clypeus averaging broader than in *calidus* (distance between corners 1.0–1.4 × distance between corner and orbit rather than 0.7–1.0).

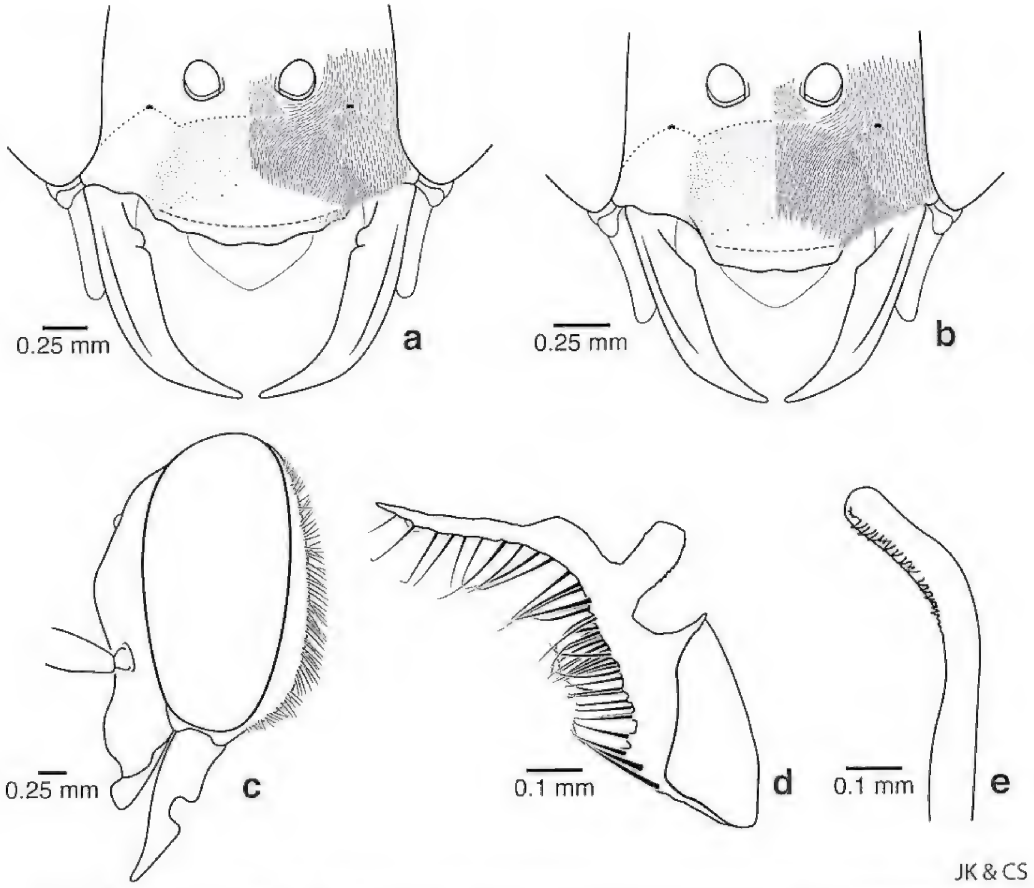

FIGURE 91. *Tachysphex cheops* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – female head in lateral view showing genal setae; d – volsella; e – penis valve.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea densely punctate (except anteriorly), punctures about one diameter apart, as long as 1.0–1.1 of scape. Free margin of lateral clypeal section less deeply concave than in most other species (Figs. 91a, b). Scutal punctures fine, shallow, nearly contiguous. Mesopleuron dull, uniformly micropunctate. Propodeal dorsum and side evenly microareolate, not ridged. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum, suberect next to occipital carina along its entire length (Fig. 91c), erect on each side of oral fossa next to occipital carina (here about 0.3–0.4 × basal mandibular width), largely concealing integument of scutum and mesopleuron. Setae of propodeal dorsum arranged in various patterns: oriented posterad along midline and obliquely posterolaterad on sides in some specimens; in others, parts of setae pointing anterad (patterns poorly preserved in most museum specimens); propodeal side setose throughout.

Head and thorax black, but the following are yellow or yellowish red: mandible (except apically), labrum, clypeal bevel and lip, and pronotal lobe posteriorly (flagellar venter reddish in single female from Nouakchott area, Mauritania). Frontal setae silvery in both sexes. Wing membrane nearly hyaline; forewing costal and subcostal veins light brown. Femora red, black basally and/or

dorsally (all femora black except apically in single male from Masirah Island, Oman), tibiae and tarsi red. Gaster all red in Pakistani and several Mauritanian specimens, tergum V more or less darkened in most African females, and segments I–III red and remainder brown or reddish in most African males and that from Masirah Island. Terga I–IV (I–III in Egyptian males) silvery fasciate apically.

♀.— Mandible: trimmal carina with unusually low subbasal teeth (Fig. 91a). Clypeus (Fig. 91a): bevel shorter than basomedian area; lip free margin arcuate, shallowly emarginate mesally, broadly and shallowly sinuous laterally; free margin of lateral section shallowly concave. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 2.5–3.6 × apical width. Forecoxa with small apical prominence. Dorsal foretibial surface with two or three spines, outer surface with two or three spines. Forebasitarsus with eight or nine rake spines. Apical spines of hindtarsomere IV reaching claw bases. Apical depression of tergum V densely punctate and setose throughout. Pygidial plate: apex emarginate, surface microsculpture inconspicuous to well defined, hence integument varying from shiny to dull. Length 10.0–14.0 mm.

♂.— Mandible: trimmal carina obtusely angulate near midlength, without cleft. Clypeus (Fig. 91b): bevel shorter than basomedian area, almost all reduced in some specimens; lip free margin arcuate, emarginate mesally in most specimens; corner rectangular to rounded; distance between corners 1.0–1.4 × distance between corner and orbit; oblique carina emerging from lip corner obtuse, not extending onto bevel. Width of postocellar area 0.6–0.9 × length. Dorsal length of flagellomere I 2.1–2.5 × apical width. Forefemoral notch dull, microsculptured, microscopically setose. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 6.7–11.0 mm. Volsella and penis valve: Figs. 91d, e.

Geographic distribution (Fig. 92).— Libya, Egypt, and Israel, south to Mauritania, Niger, and Somalia, east to Arabian Peninsula and Pakistan.

Records.— **EGYPT**: **Al Buhayrah**: Sahara Inn Hotel 117 km SE Alexandria (3 ♀, 5 ♂, FSCA). **Al Fayyum**: Karanis (3 ♂; 1 ♂, MSNT), Kom Osheim (5 ♀, 5 ♂), Wadi Rayyan at 29°02′57″N 30°18′11″E (1 ♀, 1 ♂, AMNH). **Al Iskanderiyah** (= Alexandria): Agami (de Beaumont, 1966), 50 km SSW Alexandria (1 ♂, MSNT). **Al Jizah** (= Ghiza): Abu Rawash (4 ♀, 12 ♂), 42 km NW Cairo (Pulawski, 1971), Dahshur (9 ♀, 12 ♂), Ghiza (3 ♀, 6 ♂), Saqqara (1 ♂). **Al Qahirah** (= Cairo): Maadi (Pulawski, 1971), Suez road (de Beaumont, 1940). **Al Wadi al-Jadid**: Sitra in Siwa oasis at 28°42′48″N 26°51′12″E (1 ♂, AMNH). As

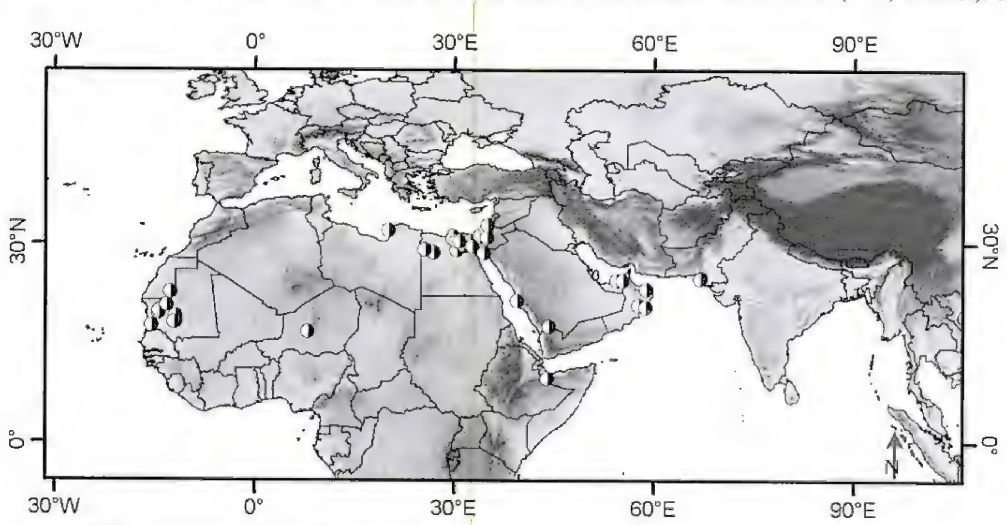

Figure 92. Collecting localities of *Tachysphex cheops*.

Sharquiyah: Serapeum (1 ♂). **Matruh**: Wadi Natrun (Pulawski, 1971). **Sina** (= Sinai): Al Arish (de Beaumont, 1940), Ras Sudr (Roche and Zalat, 1994), Wadi Ghaib 50 km SSE Nuweiba (1 ♂), Wadi Sudr 50 air km SE Suez (1 ♂), 15 km NNW Tor (1 ♂, MSNT). **Location unknown**: Sialah (1 ♀, CU). **ISRAEL**: Bat Yam (1 ♀, 1 ♂), 32 km SE Beersheba (1 ♂, CSE), Haifa: Hishon river sand flats (de Beaumont, Bytinski-Salz, and Pulawski, 1973). **LIBYA**: **Cyrenaica**: Benghazi (de Beaumont, 1947a), Jalu (Guiglia, 1940, as Gialo). **MAURITANIA**: Akjoujt (de Beaumont, 1953a), Fdérik (de Beaumont, 1953a), 70 km SE Nouakchott (1 ♀), Oued Henné ca 50 air km NE Moudjéria (2 ♀, MSNT), Oued Tayart 30 air km NW Atar (2 ♂), Rachid 40 km W Tijikja (2 ♀, 2 ♂; 2 ♂, MSNT), Tamouret Naaj ca 30 air km NE Moudjéria (1 ♀), 19°30′N 14°30′W (1 ♀; 1 ♀, KMG). **NIGER**: **Agadez Region**: 30 km S Agadez at 16°39.0′N 7°58.4′E (2 ♀). **OMAN**: 5 km N Daghmar at 23°12.9′N 58°55.8′E (1 ♀), Hail al Ghaf at 23°09.7′N 58°55.5′E (1 ♂, OHL), Masirah Island: RAF camp (1 ♂, KMG), 250 km S Nizwa = 100 km SE Ghaba Hotel (1 ♀, CSE), Wadi Qitbit at 19°09.4′N 54°30.5′E (1 ♀, 5 ♂), Wahiba Sands 11 km S Al Qabil at 22°31.0′N 58°41.2′E (4 ♂), Wahiba Sands 22 km S Al Qabil 22°22.6′N 58°38.7′E (1 ♀). **PAKISTAN**: Karachi (2 ♀, 5 ♂, BMNH), Sandspit Beach near Karachi (3 ♀, 10 ♂). **SAUDI ARABIA**: Jeddah: Bahra (1 ♂, KMG), Najran (1 ♀, ZMAN). **SOMALIA**: Hargeisa (1 ♂, BMNH). **UNITED ARAB EMIRATES**: Abu Dhabi (1 ♀, KMG), Suweihan 105 km from Abu Dhabi (1 ♀, KMG). **COUNTRY UNKNOWN**: Khor Erkuk (1 ♀, BMNH).

Tachysphex chephren de Beaumont

Figures 93, 94.

Tachysphex chephren de Beaumont, 1940:164, ♀, ♂. Holotype: ♀, Egypt: Wadi Hof near Cairo (originally A. Alfieri coll., now USNM), not examined.— de Beaumont, 1947a:165 (in revision of Egyptian *Tachysphex*); Pulawski, 1971:311 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Bohart and Menke, 1976:273 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

Recognition.— *Tachysphex chephren*, known from Lower Egypt and Israel, has a convex labrum (protruding beyond the clypeal free margin) and an elongate galea (length equal to 1.1 of scape). The species is further characterized by a densely punctate scutum (punctures minute, about one diameter apart), the setae adjacent to the hypostomal carina straight and about 1.5 × midocellar diameter long, appressed on the postocellar area and scutum. In addition, it has an infumate wing membrane, all black gaster (tergum II reddish basomedially in some males), and all black mid- and hindtibiae (midtibia reddish basally in some males). In the female, the clypeal lip is evenly arcuate (emarginate mesally), without lateral incision of sinuosity. In the male, the forebasitarsus has no rake spines, and the outer apical spine of foretarsomere II is markedly shorter than foretarsomere III.

The species is similar to *liriformis* and *notogoniaeformis*. Unlike most specimens of these species, the midfemoral venter of *chephren* is slightly compressed to form an obtuse crest (rather than evenly rounded). Unlike *notogoniaeformis*, the propodeal dorsum is all setose, with the median setae oriented anterad or anterolaterad (rather than glabrous apicomesally), and in the male the setae of the postocellar impression are appressed (rather than being erect, about 0.5 × midocellar diameter long). Unlike *liriformis*, terga I–III are silvery fasciate apically.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea densely micropunctate, longer than wide in profile, its length equal to 1.1 of scape. Scutal punctures minute, about one diameter apart. Mesopleuron evenly microsculptured, dull. Propodeal dorsum and side evenly microsculptured, but side ridged in some females. Hindcoxal dorsum with inner margin carinate basally. Midfemoral posterior surface somewhat flattened, resulting in obtuse crest on venter.

Setae erect, about 1.5 × midocellar diameter long, on each side of oral fossa next to occipital carina; appressed on postocellar area and scutum; median setae of propodeal dorsum oriented anterad or obliquely anterad, adlateral setae oriented posterad and joining apicomesally.

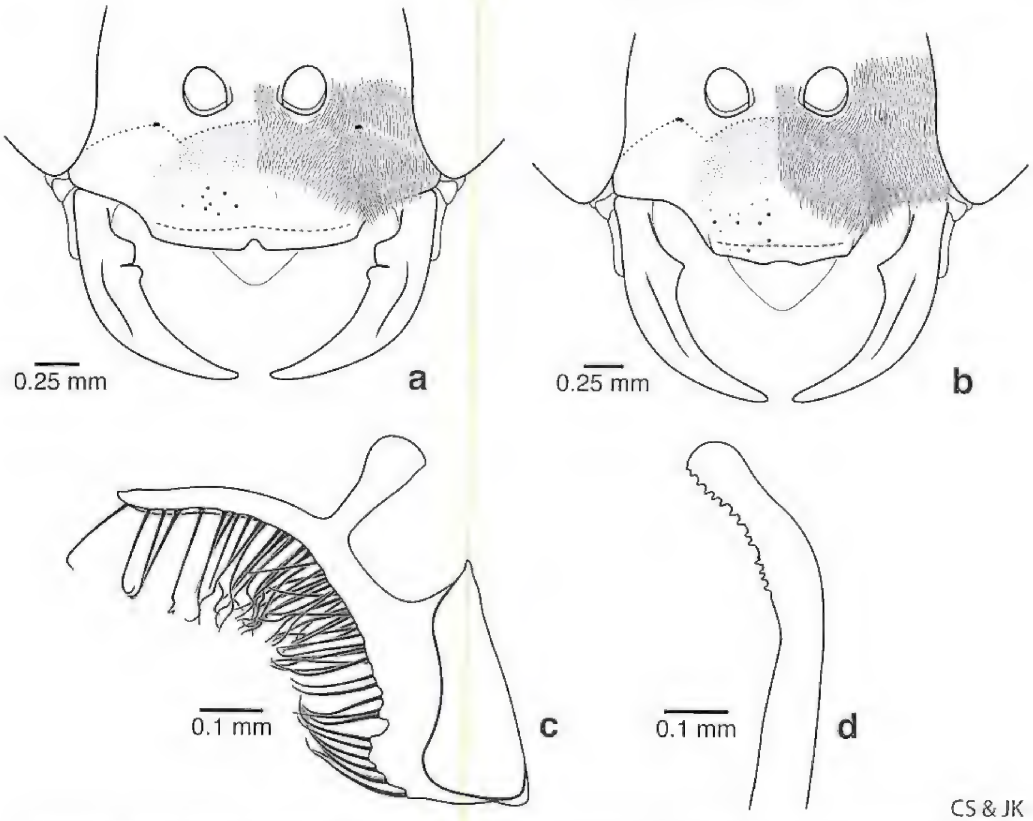

FIGURE 93. *Tachysphex chephren* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden (except ventrally) in male. Wing membrane infumate; costal vein of forewing brown, subcostal vein dark brown to black. Femora black; tibiae black except foretibia brown or reddish, at least on inner surface; also midtibia reddish basally in some males; tarsi reddish at least apically. Gaster black, tergum II reddish basomedially in some males. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 93a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, neither incised nor sinuous laterally. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 3.3–3.8 × apical width. Dorsal foretibial surface with two or three spines, outer surface with two

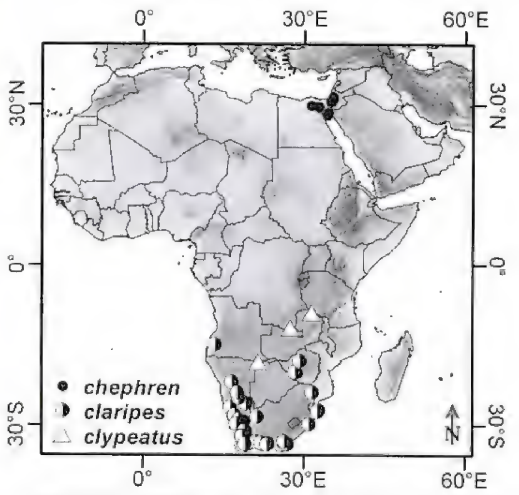

FIGURE 94. Collecting localities of *Tachysphex chephren*, *claripes*, and *clypeatus*.

spines. Forebasitarsus with eight or nine rake spines. Apical depression of tergum V varying: either densely micropunctate and setose or microsculptured but impunctate and asetose. Pygidial plate with punctures that are many diameters apart; interspaces unsculptured to alutaceous. Length 10.0–13.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 93b): bevel longer than basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin arcuate, with well-defined corner; distance between corners 0.9–1.1 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.7–3.4 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half except dull in smallest specimens. Length 7.8–11.0 mm. Volsella and penis valve: Figs. 93c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 94).— Lower Egypt, Israel.

RECORDS.— **EGYPT**: **Al Qahirah** (= Cairo): Wadi Hof (2 ♀, 1 ♂). **Sina**: Wadi Ghaib 50 km SSE Nuweiba (1 ♂), Wadi Malhaq 50 air km N Sharm el Sheikh (2 ♂), Wadi Sudr 50 air km SE Suez (1 ♂). **Location unknown**: Wadi Amraga (Pulawski, 1971). **ISRAEL**: En Boqeq (1 ♀), En Gedi (2 ♂), En Zeelim at Dead Sea at 31°23′N 35°20′W (1 ♂), Wadi Raman 70 km S Beersheba (Pulawski, 1971).

Tachysphex claripes Arnold, new status

Figures 94, 95.

Tachysphex diabolicus var. *claripes* Arnold, 1924:51, ♀, ♂. Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex diabolicus claripes*: Bohart and Menke, 1976:273 (new status, listed).

Tachysphex diabolicus var. *trifasciatus* Arnold, 1924:51, ♀, ♂. Lectotype: ♀ South Africa: Eastern Cape Province: Algoa Bay near Port Elizabeth (TMP), **here designated**, examined. **New synonym**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex diabolicus trifasciatus*: Bohart and Menke, 1976:273 (new status, listed).

LECTOTYPE SELECTION.— According to Arnold's original description of *claripes*, all the specimens examined (1 ♀, 4 ♂) came from Bulawayo. In fact, only the female (SAM, designated by Arnold as type) and a male (TMP) are labeled Bulawayo, whereas the male designated as type (and a male designated as paratype, both SAM) originated from Forest Valley. No additional male specimen is labeled as a paratype. I have selected the female as the lectotype of *claripes*, and Arnold's male type as the paralectotype.

RECOGNITION.— *Tachysphex claripes* has the labrum convex and protruding beyond the clypeal free margin (flat and not protruding in many males), galea almost as long as the scape, propodeal dorsum with a glabrous apicomedian area that is several midocellar diameters wide (Fig. 95c), gaster all black or reddish apically, and at least terga I and II (mostly I–III or I–IV) silvery fasciate apically. In addition, the setae of the episcrobal area are erect or nearly so and at least as long as midocellar diameter (nearly appressed and shorter than midocellar diameter in *lacertosus*). In the male, the clypeal lobe has a well-defined corner (corner rudimentary or absent in *psilonotus*). The female of *psilonotus* is morphologically identical to *claripes*, and the two can be distinguished only by association with topotypical males; *claripes*, however, is widely distributed in Angola, Namibia, Zimbabwe, and South Africa, whereas *psilonotus* has been found only in a few localities in southern South Africa; sympatric occurrence of these species is unknown. *Tachysphex diabolicus* also resembles *claripes*, but it lacks tergal fasciae and the male clypeal lobe is mostly narrower (distance between corners 0.5–0.8 × distance between corner and orbit, while 0.8–1.1 in *claripes*).

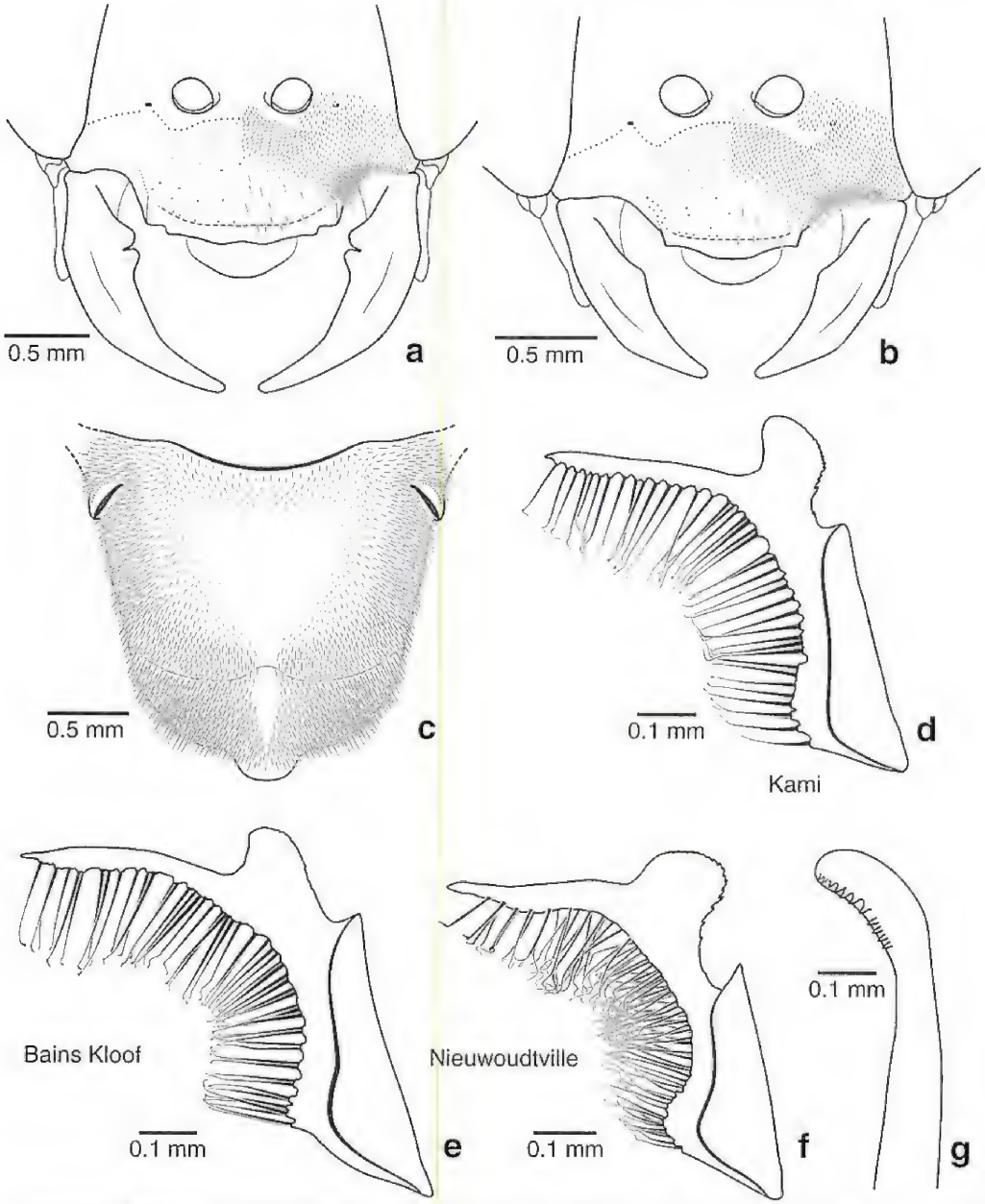

FIGURE 95. *Tachysphex claripes* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum showing setal pattern; d–f – volsella; g – penis valve.

JUSTIFICATION OF NEW SYNONYMY.— Two varieties of *diabolicus* described by Arnold (1924), *claripes* and *trifasciatus*, differ only in the number of the tergal fasciae and color of the legs and wings, none of which is constant (see Variation below for details). I do not feel that these forms warrant a formal nomenclatural status, and I regard them as synonyms. Acting as first reviser, I

select the former name as valid and the latter as its junior synonym (*claripes* and *trifasciatus* were proposed in the same publication on the same page).

STATUS OF THE SPECIES.— *Tachysphex claripes* is markedly variable in leg and wing color as well as the shape of the volsella and may actually be a complex of cryptic species. *Tachysphex diabolicus* is similar and could be considered a form of *claripes* in which the tergal fasciae are fully reduced (the color variation is almost identical in the two). However, I have not observed intergradation from fasciate to nonfasciate terga, and the clypeal lobe of the male of *claripes* is usually wider than in *diabolicus* (see Recognition above). These facts suggest that *claripes* and *diabolicus* are separate species, and I treat them as such, at least provisionally.

DESCRIPTION.— Labrum convex and protruding from beneath clypeus (but less so than in *panzeri* or *pentheri*), flat and not protruding in many males, its free margin only slightly arcuate mesally. Galea with punctures that average several diameters apart, longer than wide in profile, as long as 0.8 of scape. Scutal punctures about one diameter apart, but up to several diameters apart in many specimens (especially males). Mesopleuron dull, conspicuously, evenly microsculptured, with vestigial, shallow micropunctures. Episternal sulcus complete in some specimens. Propodeal dorsum evenly microsculptured; side ridged in female and some males, partly ridged or evenly microsculptured in many males. Hindcoxal dorsum with inner margin carinate, carina slightly expanded basally. Sternum I of many specimens apically with rudimentary, longitudinal carina.

Setae erect and slightly longer than midocellar diameter on each side of oral fossa next to occipital carina, appressed on postocellar area and scutum; propodeal dorsum with nearly appressed, inconspicuous setae that are oriented posterad, apicomesally with glabrous area that is several midocellar diameters wide (Fig. 95c).

Head and thorax black, mandible reddish at least mesally. Frontal setae silvery to golden in female, golden in male. Wing membrane and costal and subcostal veins varying in color (see Variation below). Legs varying from red to black (see Variation below). Gaster black except female segments V and VI red in single female from Bulawayo, Zimbabwe, and tergum VII red in some males from that country. Terga I–III or I–IV silvery fasciate apically (only I and II in some specimens).

♀.— Clypeus (Fig. 95a): bevel longer than basomedian area; lip free margin arcuate or emarginate mesally, incised laterally. Width of postocellar area 0.5–0.9 × length. Dorsal length of flagellomere I 2.4–3.0 × apical width. Dorsal foretibial surface with two or three spines, outer surface with one or two spines, in many specimens with sparse micropunctures (that are several diameters apart). Forebasitarsus with 6–8 rake spines (mostly seven). Apical depression of tergum V varying from punctate and setose throughout to partly or all impunctate and asetose. Pygidial plate alutaceous to unsculptured between punctures (but markedly, uniformly microsculptured in single female from Aus, Namibia); punctures averaging several diameters apart, but many punctures about one diameter apart near margin. Length 10.4–13.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 95b): bevel as long or longer than basomedian area; lip free margin evenly arcuate, obtusely pointed, or emarginate mesally, with well-defined corner and short carina emerging from each corner; distance between corners 0.9–1.1 × distance between corner and orbit in most specimens, 0.8–0.9 in some. Width of postocellar area 0.4–0.8 × length. Dorsal length of flagellomere I 1.6–2.3 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 3–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sternum VIII varying from nearly straight between lateral prongs to tridentate. Length 7.7–11.6 mm. Volsella and penis valve: Figs. 95d-e.

VARIATION.— *Tachysphex claripes* varies in the shape of the male hindfemur, setation of the male sterna, color of wings and legs, and in the number of tergal fasciae, as described below.

Male hindfemur: the inner margin of the hindfemoral venter is either dull or sharp in distal half (sharp in many South African specimens). Both form may occur within the same population, e.g., in Richtersveld National Park, South Africa.

Male sterna: the apical depressions of sterna IV–VI have suberect setae that are up to one midocellar diameter long in specimens from Angola, Namibia (Aroab to Koës, Kalkrand area), Zimbabwe, and South Africa: Arkeop Farm, Goegap Nature Reserve, E Kamieskroon, Koup Siding to Laingsburg, Letaba Reserve, Nieuwoudtville, Ratelfontein area, Richtersveld National Park, and some from Springbok area; these setae are nearly appressed in Namibian males from Okahandja area, in South African males from Algoa Bay, Ceres, 20 km N Citrusdal, Grahamstown area, Groenkloof, Kenton-on-Sea, Mbazwana, and some from Springbok area; and appressed in South African specimens from Bains Kloof, Kamieskroon, Kamieskroon to Sors Sors, S Lambert's Bay, Martindale Forest Reserve, Oudtshoorn, Paleisheuwel, Port Alfred District, Swartberg Pass, Voëlklip, and Wellington.

Color of wings:

(a) wing membrane yellow, costal and subcostal veins reddish brown: specimens from Angola, Namibia (Okahandja area), Zimbabwe, and the following South African localities: Algoa Bay, Bains Kloof, 20 km N Citrusdal, Durban, 20 km S Emanguzi, Grahamstown area, Kenton-on-Sea, Knersvlakte, Letaba Reserve, Martindale Forest Reserve, Mbawana, Oudtshoorn, Port Alfred District, Ratelfontein area, Stellenbosch, Swartberg Pass, Uniondale, Vlakwater, and Wellington;
(b) wing membrane yellow, costal vein brown, subcostal vein black: males from Groenkloof, E Kamieskroon, Kamieskroon to Sors Sors, Nieuwoudtville, Richtersveld National Park, and Springbok area;
(c) wing membrane slightly infumate, costal vein light brown, subcostal vein dark brown: Angola, Namibia (Kalkrand area, Mariental to Keetmanshoop), and South African specimens: females from Die Berg, Elisabethfontein, Kamiesberg area, Kamieskroon, and Voëlklip, and males from Citrusdal area, Goegap Nature Reserve, Koup Siding to Laingsburg, Lambert's Bay area, Richtersveld National Park, and Vioolsdrif area;
(d) wing membrane infumate, costal and subcostal veins reddish brown: female from Swartberg Pass, male from Ceres (membrane slightly infumate);
(e) wing membrane infumate, costal vein brown and subcostal vein almost black: single female from Aus, Namibia; South African females from Cape Town, Hilton Farm, Hondeklipbaai area, Olifantsrivier, Olifantsrivier upper sources, Paleisheuwel; South African males from Arkoep Farm and Keimos to Lutzputz; and females and males from Lambert's Bay.

Color of female legs:

(a) femora, tibiae, and tarsi red (except femora black basally): specimens from Zimbabwe and South African specimens from Cape Town, Hilton Farm, and Olifantsrivier;
(b) femora black (except apically), tibiae and tarsi red: females from Algoa Bay, Kenton-on-Sea, Knersvlakte, Uniondale, and Vlakwater, all South Africa;
(c) femora and tibiae black except foretibial inner surface red in females from the following South African localities: Elisabethfontein, Lambert's Bay area, Paleisheuwel, Swartberg Pass, Voëlklip (also midtibial venter in a female from Algoa Bay, Durban, and some females from Clanwilliam area, S Lambert's Bay, and Paleisheuwel);
(d) legs all black: single female from Aus, Namibia, two females from 20 km S Emanguzi, South Africa.

Color of male legs:

(a) femora red except black basally or fore- and midfemora black except red apically, tibiae and tarsi red: specimens from Namibia, Zimbabwe and South Africa: Goegap Nature Reserve, E Kamieskroon, Keimos to Lutzputz, Letaba Reserve, Nieuwoudtville, Richtersveld National Park, Springbok area, and Vioolsdrif area;

(b) femora black (except apically), tibiae and tarsi red: specimens from Algoa Bay, Kamieskroon to Sors Sors, Kenton-on-Sea, Martindale Forest Reserve, Mbazwana, Oudtshoorn, Port Alfred District, and Richtersveld National Park; the single male from Angola is similar but has the midfemoral venter red in the apicoventral half;

(c) femora and hindtibia black, fore- and midtibiae largely red to largely black (only foretibial outer surface and midtibial apex red in some): South African specimens from Bains Kloof, Ceres, 20 km N Citrusdal, Groenkloof, Kamieskroon, S Lambert's Bay, Paleisheuwel, Ratelfontein area, Swartberg Pass, Voëlklip, and Wellington.

Tergal fasciae. The only female examined from Zimbabwe has terga I–III silvery fasciate apically, and a rudimentary fascia on tergum IV. Terga I–IV are fasciate in most males from that country, but tergum IV is nonfasciate in some (the number of fasciae may vary among specimens from the same locality, e.g., in specimens from Kami collected the same day on the same site). Only terga I–III are fasciate in most South African specimens and the males from Angola and Namibia, but the fasciae are evanescent in the female from Hondeklipbaai area, the fascia of tergum III is evanescent in a male from Algoa Bay, and only terga I and II are fasciate in a female from Knersvlakte and one from Vlakwater (fasciae rudimentary), in one of the two males from Arkoep Farm, one from Ceres, one from Goegap Nature Reserve, and some from Richtersveld National Park.

Floral records.— Specimens from Keimos to Lutzputz, South Africa, were collected on flowers of *Zygophyllum simplex* L. (Zygophyllaceae), that from Mariental to Keetmanshoop, Namibia, on flowers of *Galenia* sp. (Aizoaceae), as recorded by F.W. and S.K. Gess, the collectors.

Geographic distribution (Fig. 94).— Angola, Namibia, Zimbabwe, South Africa.

Records.— **ANGOLA**: Tundavala 8–10 mi NW Sa da Bandeira (1 ♂, BMNH). **NAMIBIA**: **Keetmanshoop District**: 102 km road from Aroab to Koës (2 ♂, AMG). **Lüderitz District**: Aus (1 ♀, BMNH). **Mariental District**: Mariental to Keetmanshoop at 24°54′S 17°55′E (1 ♂, AMG). **Okahandja District**: ca 30 km W Okahandja (1 ♂; 1 ♂, OHL). **Rehoboth District**: 15 km N Kalkrand (1 ♂). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (1 ♀, 2 ♂, TMP, including lectotype and paralectotype of *trifasciatus*), 2 mi ESE Grahamstown (1 ♂, AMG), 18 km WNW Grahamstown: Hilton Farm (1 ♀; 2 ♀, AMG; 1 ♀, PMA), Kenton-on-Sea (3 ♀, 3 ♂, AMG), Martindale Forest Reserve (1 ♂, AMG), Olifantsrivier 30 km NNE Uniondale at 33°27′S 23°19′E (1 ♀), Port Alfred District (1 ♂, AMG), Vlakwater 27 air km NW Grahamstown (1 ♀, AMG). **Kwazulu-Natal**: Durban: Burman Bush (1 ♀, AMG), 20 km S Emanguzi (2 ♀, OÖLM), Mbazwana (1 ♂, OÖLM). **Northern Cape Province:** Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (2 ♂, PPRI), Garies: Klip Vlei (1 ♀, SAM), Goegap Nature Reserve (7 ♂, AMG), Groenkloof at 30°22′S 18°07′E (1 ♂, AMG), 25 km E Hondeklipbaai (1 ♀, OÖLM), Kamiesberg to Sors Sors at 30°11′S 18°01′E (1 ♀, AMG), Kamieskroon: Bakleikraal at 30°13′S 18°03′E (2 ♂, AMG), Kamieskroon (1 ♂, OÖLM), Kamieskroon to Sors Sors (1 ♂, AMG), Keimos to Lutzputz at 28°28′S 21°15′E (2 ♂, AMG), Nieuwoudtville: Skuinshoogte Pass at 31°16′S 19°08′E (1 ♂, AMG), Richtersveld National Park: 1.5 km from Helskloof gate at 28°18′S 16°57′E (1 ♂, AMG), Richtersveld National Park: Koeroegabvlakte at 28°11′S 17°03′E (2 ♂, AMG), at 28°18.9′S 16°58.3′E (27 ♂; 5 ♂, BMNH), and at 28°08.7′S 17°00′E (3 ♂), 90 km ENE Springbok at 29°20.1′S 18°44.3′E (5 ♂), 29 km N Springbok at 29°27′S 17°51′E (1 ♂, AMG), 40 km S Vioolsdrif at 29°02′59″S 17°50′32″E (1 ♂, CSE), Voëlklip at 29°45′S 17°22′E (1 ♀, 1 ♂, AMG). **Northern Province**: Letaba Reserve at 23°51′S 31°35′E (3 ♂, AMG). **Western Cape Province**: Bains Kloof in Wit River Valley (2 ♂; 5 ♂, SAM), Cape Town (1 ♀, SAM), Ceres (1 ♂, BMNH), 20 km N Citrusdal (3 ♂, OÖLM), 5 km W Clanwilliam (1 ♀, AMG), Clanwilliam Dam at 32°12′S 18°54′E (1 ♀, AMG), Die Berg in Clanwilliam District at 32°10–16′S 18°49′E (1 ♀, AMG), Elisabethfontein 19 km NE Clanwilliam at 32°04′45″S 19°03′29″E (1 ♀, CSE), Knersflakte: Kalkgat (1 ♀, OHL), Koup Siding to Laingsburg (1 ♀, 2 ♂, SAM), 9 km ENE Lambert's Bay at 32°04′30″S 18°23′30″E (1 ♀; 1 ♀, CSE), S Lambert's Bay (1 ♀, 3 ♂; 4 ♀, 9 ♂, OÖLM), Olifantsrivier upper sources (1 ♀, SAM), Oudtshoorn (2 ♂, AMG), Paleisheuwel (2 ♀; 7 ♀, 2 ♂, SAM), Ratelfontein to Oloff Berghfontein at 32°02–15′S 18°35–31′E (1 ♂; 4 ♂, AMG), Stellenbosch (1 ♀, TMP), near Swartberg Pass at 33°20′S 22°02′E, ca 1450 m (1 ♀, 2 ♂), Uniondale (1 ♀, SAM, erroneously labeled by G. Arnold as paratype), Wellington: Rooshoek (1 ♂, RMNH). **ZIMBABWE**:

Bulawayo (1 ♀, SAM, lectotype of *claripes*; 1 ♂, TMP), Bulawayo: Forestvale (5 ♂ SAM, including paralectotype and paratype of *claripes*; 1 ♂, TMP), Kami Ruins (12 ♂), Redbank at Kami River (1 ♂, SAM), Sanyati Valley (6 ♂, SAM).

Tachysphex clypeatus Arnold

Figures 94, 96.

Tachysphex clypeatus Arnold, 1947:147, ♀, ♂. Lectotype: ♀, Northern Rhodesia: Abercorn, now Zambia: Mbala (SAM), **here designated**, examined.— Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex clypeatus* has the labrum convex and markedly protruding beyond the clypeal free margin, propodeal dorsum glabrous apicomesally (glabrous area markedly larger than midocellus), and at least terga I–III silvery fasciate apically. Several species are similar, but *clypeatus* has a distinctive femoral sculpture: in the female, the fore- and midfemoral posteroventral surface (at least near the apex) is unsculptured or aciculate, with only a few, sparse punctures; in the male, the forefemoral posteroventral surface is sparsely punctate between notch and apex (punctures several diameters apart near the femoral midlength), and the midfemur is closely punctate throughout (interspaces about 1–2 diameters apart) except sparse apicoventrally.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea with large, sparse punctures, longer than wide in profile, as long as scape. Scutal punctures well defined, on disk about 1–2 diameters apart in female, up to several diameters apart in male; interspaces shiny, unsculptured. Mesopleuron dull, evenly microsculptured and with ill-defined punctures that are several diameters apart. Propodeal dorsum either evenly microareolate or (specimen from Zaire) irregularly rugose except longitudinally ridged basally; side ridged but ridges evanescent anteriorly in male. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect, about as long as midocellar diameter, on each side of oral fossa next to occipital carina; appressed on postocellar area, scutum, and midfemoral venter; propodeum with glabrous apicomedian area that is about two thirds length of dorsum in female and about one third in male; setae oriented posterad adjacent to glabrous area.

Head and thorax black, mandible reddish mesally. Frontal setae golden or with golden tinge in female, golden in male. Wing membrane conspicuously yellow; costal and subcostal vein of forewing reddish brown. Femora red except black basally, tibiae and tarsi red. Gaster color varying: segments I and II red and remainder black in specimens from Zambia, also segment III red in specimen from Zaire, and gaster black except segment VI red in females from Namibia. Terga I–III in female, I–IV in male, silvery fasciate apically.

♀.— Clypeus (Fig. 96a): bevel longer than basomedian area; lip free margin arcuate, shallowly emarginate mesally, incised laterally. Width of postocellar area 0.7 × length. Dorsal length of flagellomere I 2.5 × apical width. Fore- and midfemoral posteroventral surface, at least near apex, unsculptured except for a few, sparse punctures. Dorsal foretibial surface with two spines, outer surface asetose, with two spines. Forebasitarsus with eight rake spines. Apical spines of hindtarsomere IV nearly reaching claw bases. Tergum V punctate and setose throughout in lectotype, including apical depression, but apical depression impunctate, glabrous in other specimens. Pygidial plate with well defined punctures that range from about one to several diameters apart; interspaces aciculate in most specimens, unsculptured apically in lectotype. Length 13.1–15.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 96b): bevel longer than basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin arcuate, slightly emarginate mesally, with well-defined corner; distance between corners 1.1 × distance between corner and orbit. Width of postocellar area 0.9 × length. Dorsal length of flagel-

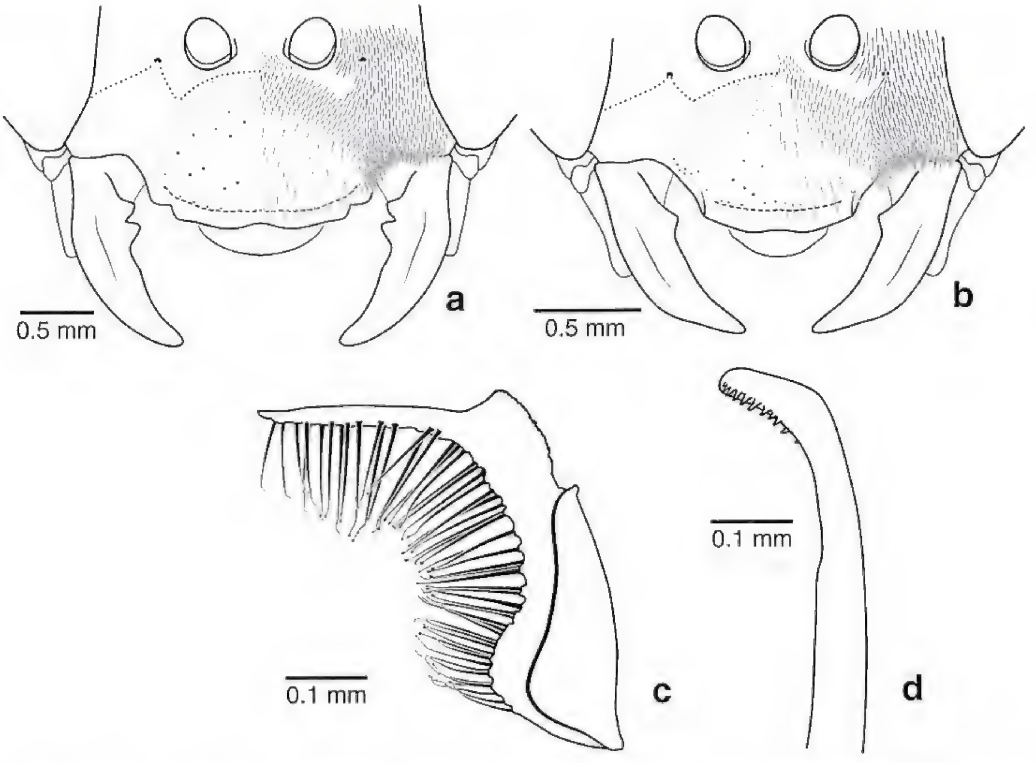

FIGURE 96. *Tachysphex clypeatus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

lomere I 2.0 × apical width. Forefemoral posteroventral surface sparsely punctate between notch and apex, punctures several diameters apart near femoral midlength; notch microscopically punctate and setose, punctures and setae sparser than in most other species. Midfemur closely punctate (punctures about 1–2 diameters apart) except sparser apicoventrally. Outer margin of forebasitarsus with six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 14.3 mm. Volsella and penis valve: Figs. 96c, d.

COLLECTING PERIOD.— 2, 18, and 25 August, 11 September.

GEOGRAPHIC DISTRIBUTION (Fig. 94).— Zaire, Zambia, northern Namibia.

RECORDS.— **NAMIBIA: Rundu District**: Andara (1 ♀; 1 ♀, NMN). **ZAIRE: Shaba**: Lubumbashi: Kipopo (1 ♀, FSAG). **ZAMBIA: Northern Province**: Mbala (1 ♀, 1 ♂, SAM, lectotype and paralectotype of *clypeatus*).

Tachysphex congoensis Arnold, new status

Figure 105.

Tachysphex ambiguus var. *congoensis* Arnold, 1924:53, ♀. Holotype: ♀, Zaire: Elisabethville, now Lubumbashi (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Schouteden, 1930:91 (Zaire: Lubumbashi).— As *Tachysphex ambiguus congoensis*: Bohart and Menke, 1976:272 (new status, listed).

RECOGNITION.— *Tachysphex congoensis*, an all black species, has the scutal and mesopleural punctures well defined, labrum flat and galea shorter than wide in profile, hindwing crossvein

cu-a vertical, setae of propodeal dorsum diverging anterad from the midline, and tarsi unspecialized (length of midtarsomere II more than twice width, length of hindtarsomere IV greater than width, apical tarsomeres without spines on venter or lateral margins).

The female resembles *consocius* and *diversilabris* in having the middle clypeal section convex and the clypeal lip incised laterally (as in Fig. 97a). Unlike *consocius*, most mesopleural setae of *congoensis* are sinuous (rather than straight), and unlike *diversilabris* the apical depression of tergum V is impunctate and asetose.

The male of *congoensis* resembles *consocius* in having a dorsal, longitudinal sulcus on flagellomeres III–IX that separates two variously setose areas (see Figs. 98c–f), although the sulcus is faint, and the clypeal lobe has a corner on each side. Unlike *consocius*, most mesopleural setae of *congoensis* are sinuous (rather than straight). As in some *consocius*, the trimmal carina is reduced and obtuse just distad of tooth, and the cleft is absent (as in Fig. 98b).

STATUS.— Although described as a variety of *ambiguus*, *congoensis* is actually closer to *consocius* and *diversilabris*. I regard it as a full species at this time, but perhaps it is just an extreme form of *consocius* (see Dimorphic Males under that species). Its status cannot be ascertained at this time, given the limited material available for study.

DESCRIPTION.— Scutal punctures well defined, most punctures on disk more than one diameter apart. Mesopleural punctures well defined, several diameters apart below scrobe; interspaces unsculptured, shiny. Propodeal dorsum irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area (setal length about 1.5 × midocellar diameter), suberect on scutum; suberect, slightly sinuous on each side of oral fossa next to occipital carina (setal length almost 2.0 × midocellar diameter); most mesopleural setae sinuous; midfemoral setae suberect on venter (greatest setal length 2.0 × midocellar diameter); inclined obliquely anterad on propodeal dorsum.

Head, thorax, gaster, and legs black, mandible dark reddish mesally, tarsal apex reddish. Frontal setae silvery in both sexes. Wing membrane infumate; costal and subcostal vein of forewing brown. Terga I–IV silvery fasciate apically.

♀.— Clypeus (as in Fig. 97a): bevel longer than basomedian area; lip free margin slightly sinuate, incised laterally. Width of postocellar area 1.5 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width. Dorsal foretibial surface with two thin spines, outer surface with one thin spine or without spines or suberect bristles. Forebasitarsus with seven rake spines. Apical depression of tergum V impunctate, asetose. Pygidial plate with punctures averaging many diameters apart except a few punctures near margin about one diameter apart; interspaces shiny, unsculptured. Length 8.8–8.9 mm.

♂.— Mandible: trimmal carina with tooth, without cleft, conspicuously emarginate between tooth and apex (as in Fig. 98b). Clypeus (as in Fig. 98a): bevel ill defined but shorter than basomedian area; lip free margin minimally arcuate, almost straight, with well-defined corner; distance between corners 1.4 × distance between corner and orbit. Width of postocellar area 2.0 × length. Dorsal length of flagellomere I 1.7 × apical width. Flagellomeres III–IX with ill-defined dorsal, longitudinal groove that separates two differently setose areas. Forefemoral notch glabrous; outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Sternum VIII tridentate apically. Length 6.1 mm. Volsella and penis valve as in *consocius*, volsellar process as in upper left outline in Fig. 99.

COLLECTING DATES: 10–18 June and 3 July 1920.

GEOGRAPHIC DISTRIBUTION (Fig. 105).— Known from one locality in Zaire.

RECORDS.— **ZAIRE**: **Shaba**: Lubumbashi (1 ♀: 1 ♀, MCZ; 1 ♀, SAM, holotype of *congoensis* Arnold); Kimilolo River, Lubumbashi (1 ♂).

***Tachysphex consocius* Kohl**
Figures 97–100.

Tachysphex consocius Kohl, 1892:217, ♀. Holotype: ♀, Azerbaijan: Helenendorf, now Khanlar (NHMW), examined before 1971.— Pulawski, 1971:185 (in revision of Palearctic *Tachysphex*); Erlandsson, 1974:71 (Italy); Bohart and Menke, 1976:273 (listed); Kazenas, 1978:121, 131 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:218, 221 (in key to Sphecidae of European USSR); Guichard, 1980:227 (Oman); Pagliano, 1980:128 (Italy); Rodgers and Homewood, 1982:233 (Tanzania); Schmidt and Westrich, 1983:123 (Greece); Gayubo, 1984a:84 (Spain), 1984b:363 (Portugal); Scobiola-Palade, 1985:96 (Romania); Gayubo, 1986a:32 (Spain); Gayubo and Sanza, 1986:44 (Spain); Islamov, 1986:526 (Uzbekistan); Gayubo and Mingo, 1988:77 (Spain); Asís, Gayubo, and Tormos, 1989:236 (nest and prey); Pádr *in* Šedivy, 1989:168 (Czechoslovakia); Gayubo, Asís, and Tormos, 1990:17 (Spain); Pagliano, 1990:103 (Italy); Gayubo, Borsato, and Osella, 1992:281 (France: Corse); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Krombein and Pulawski, 1994:10 (nest and prey), 28 (in revision of Sri Lankan *Tachysphex*); Tormos, Asís, and Gayubo, 1994:188, 204 (Spain); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Minoranskiy and Shkuratov, 1996:81 (Russia: Rostov Oblast'); Dollfuss, Gusenleitner, and Bregant, 1998:515 (Austria); Nazarova, 1998:40 (Tajikistan:); Gayubo, García, Torres, and González, 1999:89 (Spain); Gayubo, González, and Torres, 2000:185 (Spain); Shkuratov, 2000:58 (Russia: Rostov Oblast'); Ivanov and Ljubomirov, 2001:21 (Bulgaria); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia); Ljubomirov, 2001b:49 (Bulgaria); Schmidt and Bitsch *in* Bitsch et al., 2001:241 (in Sphecid Fauna of Western Europe); Kazenas, 2002:66 (Kazakhstan); Shkuratov, 2002:140 (Russia: Rostov Oblast'); Gayubo, Özbek, and Yildirim, 2003:88 (Turkey); González et al., 2003:61 (Spain); Nieves-Aldrey et al., 2003:42 (Spain); Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004:108 (Spain: Madrid: Monte de el Pardo); Cruz-Sánchez et al., 2005:220 (Spain); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex cabrerai Mercet, 1909:196, ♀, ♂ (as *Cabrerai*, incorrect original capitalization). Syntypes: Spain: Madrid (MNCN), not examined. Synonymized with *Tachysphex consocius* by Pulawski, 1971:185.— Mercet, 1910:165 (listed from Spain); de Beaumont, 1936a:209 (in revision of French *Tachysphex*), 1940:176 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); Giner Marí, 1943:138 (in Sphecid Fauna of Spain); de Beaumont, 1947a:201 (in revision of Egyptian *Tachysphex*), 1947b:393 (Cyprus); de Andrade, 1949:15 (Portugal); de Beaumont, 1950d:20 (Egypt); Pittioni, 1950:25 (Cyprus); de Beaumont, 1954a:59 (Italy), 1954b:91 (Italy); Grandi, 1954:238 (Italy, partly as *cabrerai* var. ?); de Beaumont, 1955:184 (Morocco); Ceballos, 1956:376 (listed from Spain); de Beaumont, 1956a:199 (Libya); Grandi, 1957:389 (Italy); Nouvel and Ribaut, 1958:13 (France); Pulawski, 1958a:181 (Bulgaria); Diniz, 1959:29 (Portugal); Suárez, 1959:58 (Spain); de Beaumont, 1960a:19 (Greece: Rhodes), 1960b:239 (Libya), 1961a:50 (Greece: Crete), 1962:26 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Diniz, 1964:29 (Portugal); Pulawski, 1964:95 (Egypt); de Beaumont, 1965:51 (Greece), 1966:212 (Egypt); Pulawski, 1967:408 (Turkey); de Beaumont, 1970a:401 (Afghanistan); Georghiou, 1977:192 (Cyprus); Dollfuss, 1989:13 (type material in NHMW).

Tachysphex minutulus Arnold, 1923:160, ♀, ♂. Lectotype ♂, Zimbabwe: Bulawayo (SAM), **here designated**, examined. Synonymized with *Tachysphex consocius* by Pulawski *in* Bohart and Menke, 1976:273.— Arnold, 1924:57 (correction to original description), 1930:3 (in checklist of Afrotropical Sphecidae).

Tachysphex grandii de Beaumont, 1965a:51, ♀, ♂. Holotype: ♂, Italy: Bologna: Gaibola (Bologna Univ.), examined. Synonymized with *Tachysphex consocius* by Pulawski *in* Krombein and Pulawski, 1994:28.— Pulawski, 1967:408 (Turkey), 1971:182 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed); Kazenas, 1978:121, 131 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:218, 221 (in key to Sphecidae of European USSR); Dollfuss, 1983:10 (Austria); Gayubo, 1984a:96 (Spain), 1984b:364 (Portugal: El Algarve Province), 1986a:33 (Spain); Gayubo and Sanza, 1986:45 (Spain); Islamov, 1986:526 (Uzbekistan); Dollfuss, 1987:21 (Austria); Gayubo, 1987:112 (Spain); Gayubo and Mingo, 1988:79 (Spain); Karsai, 1988:100 (Hungary); Pádr *in* Šedivy, 1989:168 (in checklist of Czechoslovak Sphecidae); Gayubo, Asís, and Tormos, 1990:17 (Spain); Day, 1991:xix (in summary of

European Endangered Hymenoptera Lists); Gusenleitner, 1992:685 (Austria); Dollfuss, 1994:100 (endangered in Austria); Minoranskiy and Shkuratov, 1996:81 (Russia: Rostov Oblast'); González, Gayubo, and Torres, 1998:72, 73 (Spain); Gayubo, García, Torres, and González, 1999:89 (Spain); Gayubo, González, and Torres, 2000:185 (Spain); González, Gayubo, and Torres, 1999:335 (Spain); Ljubomirov, 1999:49 (Bulgaria); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia); Kazenas and Esenbekova, 2001:134 (Kazakhstan); Zettel, Gross, and Mazzucco, 2001:72 (Austria: Wien); Kazenas, 2002:68 (Kazakhstan); Shkuratov, 2002:141 (Russia: Rostov Oblast'); Gayubo et al. 2004:131 (Spain).
Species 1 (part) and 3 (part): van Noort, Prinsloo, and Compton, 2000:348 (Namibia), **present correction**.

LECTOTYPE SELECTION.— Arnold (1923) mentioned a single type in the original description of *minutulus*, but he designated as types a pair of specimens mounted on the same cardboard rectangle. I have designated the male as the lectotype and the female as the paralectotype.

RECOGNITION.— *Tachysphex consocius* is a widely distributed, commonly collected species that has a shiny mesopleuron with well-defined punctures (punctures minute in some specimens), the setae erect on the postocellar area, nearly so on the scutum and midfemoral venter (Figs. 32, 33), and inclined obliquely anterad on the propodeal dorsum. Other characters include: gaster, femora, and tibiae black; labrum flat, not emarginate; and tarsi unspecialized (length of midtarsomere II more than twice width, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins).

The female differs from other such species except *diversilabris*, *congoensis*, and some *aterrimus* (three rarely collected species) in having a sinuate, laterally incised clypeal lip (Fig. 98a), although the incisions are rudimentary in some specimens and may disappear in worn individuals. Unlike *congoensis* and *diversilabris*, the mesopleural setae of *consocius* are straight with apex angled (rather than sinuous at least anteriorly), and unlike *diversilabris*, the apical depression of tergum V is unsculptured and asetose. In addition, the setae of the postocellar area in *consocius* are 1.0–1.5 midocellar diameters long (2.0–3.0 diameters in *diversilabris*). The setae, however, are probably all straight in some *diversilabris*. Color details also help in recognition: the mandible is largely reddish mesally in most specimens, and the pygidial plate is reddish apically in many. In *diversilabris*, the mandible varies from all black to black with a reddish preapical zone, and the pygidial plate is all black. Unlike *aterrimus*, the middle clypeal section of *consocius* is convex, with a well-defined bevel (rather than flat, with ill-defined bevel). The female of *saturnus* also resembles *consocius* but has the clypeal lip with two lateral incisions (Fig. 332a) and a black pygidial apex.

In the male, sternum VIII is tridentate (Fig. 98g), but the middle tooth is rudimentary in small specimens. A subsidiary recognition character is a broad clypeal lobe (Figs. 98a, b) with well-defined corners (distance between corners 1.3–1.4 × distance between corner and orbit). In most but not all specimens, flagellomeres III–XI have two longitudinal grooves (one dorsal and one ventral) that delimit two differently setose areas (Figs. 98e–f), a feature shared with *diversilabris*, *omoi*, and some *saturnus*. Unlike *omoi*, the tibiae of *consocius* are all black, and *saturnus* has a distinctive clypeus (see that species, p. 557).

Many (but not all) African and Yemeni specimens have an unsculptured area that extends from the supraantennal callosity to the orbit or nearly so (Fig. 97b), a feature unique within the genus.

SYNONYMY.— De Beaumont (1965) and Pulawski (1971) thought that *consocius* and *grandii* were separate species that differed in sculpture of the upper frons, setal length, and thickness of male flagellum. Pulawski *in* Krombein and Pulawski (1994) demonstrated that these differences intergraded and were not correlated with each other, and synonymized these two names.

Tachysphex consocius mookonis Tsuneki, 1972, described from Mongolia, is a junior synonym of *nitidissimus* de Beaumont, 1952, as shown by Krombein and Pulawski, 1994:29.

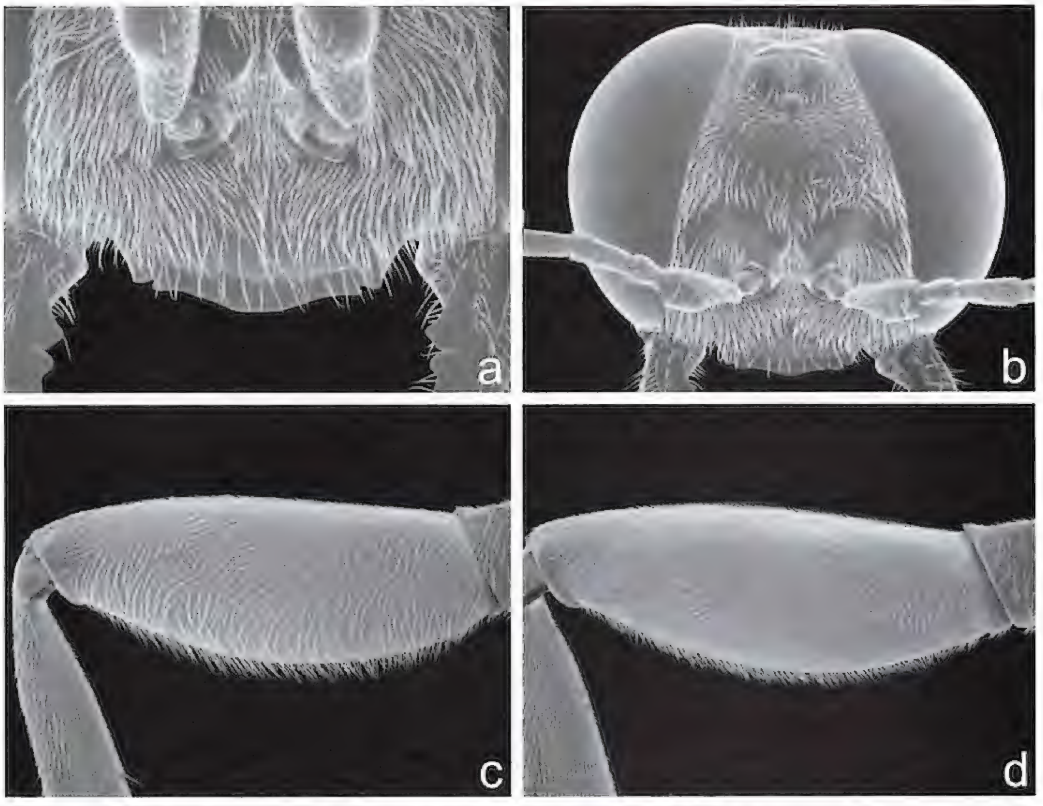

FIGURE 97. *Tachysphex consocius* Kohl, female: a – clypeus (×47); b – head of sub-Saharan specimen showing unsculptured supraantennal area (×36); c – midfemur of a specimen from Spain (×60); d – midfemur of a specimen from Bulgaria (×58).

DESCRIPTION (see also Dimorphic Males below).— Scutal punctures well defined, on disk varying from nearly contiguous to many diameters apart. Mesopleuron punctate, with shiny interspaces (see Variation below for details). Punctures of mesothoracic venter averaging one diameter apart or nearly so, but up to two or three diameters apart in specimens from southwestern Europe. Propodeal dorsum ridged (ridges evanescent posteriorly in some specimens); side ridged. Hindcoxal dorsum with inner margin carinate, carina not expanded basally.

Setae erect on postocellar area, suberect on scutum and midfemoral venter (Figs. 97c, d), inclined anterad on propodeal dorsum, varying in length both geographically and individually (see Variation below).

Head, thorax, legs, and gaster black except mandible reddish mesally (nearly black in some African specimens); apical tarsomeres reddish in many specimens and pygidial plate reddish apically in most Palearctic and many sub-Saharan females. Wing membrane almost hyaline with brown veins in most populations, but slightly yellowish, with yellowish veins, in Sri Lankan specimens. Frontal vestiture silvery in both sexes. Terga I–III or I–IV in female, I–IV or I–V in male, silvery fasciate apically.

♀.— Clypeus (Fig. 97a): bevel longer than basomedian area; lip sinuate, incised laterally (incisions varying from deep, narrow, to broad, shallow, or rudimentary). Dorsal length of flagellomere I 1.5–2.2 × apical width. Width of postocellar area 1.5–1.7 × length. Dorsal foretibial surface with a few fine bristles, outer surface with one thin spine or without spines. Forebasitarsus with six or

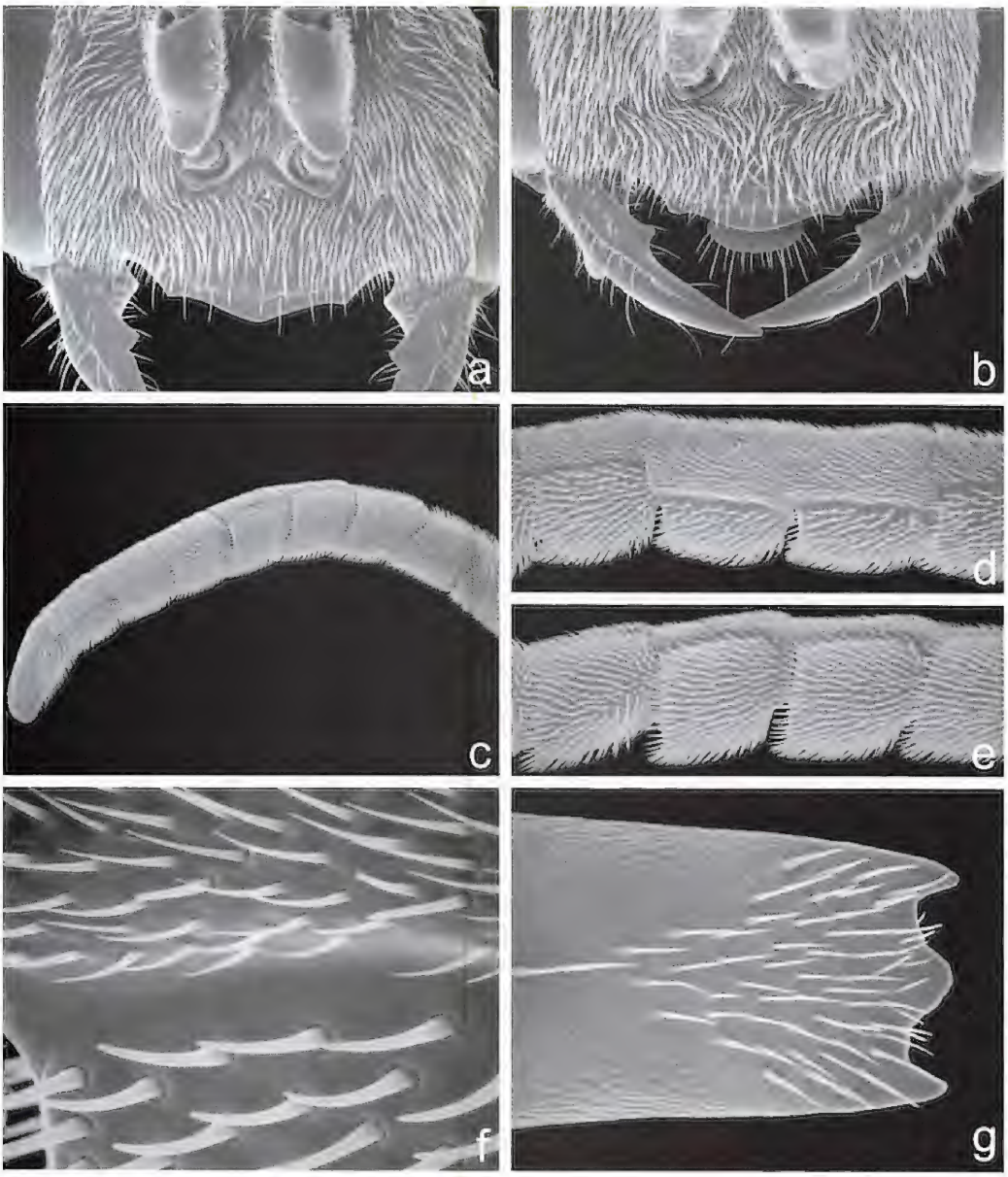

FIGURE 98. *Tachysphex consocius* Kohl, male: a – clypeus (×67); b – clypeus and unusual mandible (×72); c – flagellomeres IV–XI (×60); d – flagellomeres V–VII in lateral view (×120); e – same in dorsal view (×120); f – portion of flagellomere V in dorsal view (×900); g – apical portion of sternum VIII (×360).

seven rake spines. Pygidial plate shiny, sparsely punctate. Length 6.0–9.4 mm.

♂.— Mandible: trimmal carina with tooth and in most specimens with rudimentary, widely open cleft. Clypeus (Figs. 98a, b): bevel shorter than basomedian area in most specimens, longer than basomedian area in some; lip free margin arcuate, not pointed to prominently pointed mesally (slightly pointed in most specimens), with well-defined corner; distance between corners 1.3–1.4 ×

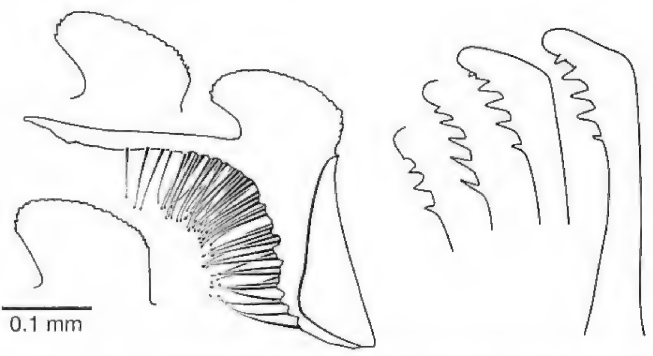

FIGURE 99. *Tachysphex consocius* Kohl: volsella and penis valve with outlines showing variation.

distance between corner and orbit. Flagellum in live specimens partly pectinate ventrally: flagellomeres V–IX acutely projected apicoventrally, with conspicuous gaps between articles (Fig. 98e), but gaps closed and flagellum buckling up in dried specimens; flagellomeres III–XI of most (but not all) specimens with two longitudinal grooves (one dorsal and one ventral) that delimit two differently setose areas (Figs. 98c–f). Dorsal length of flagellomere I 1.5–2.1 × apical width. Width of postocellar area 1.9–2.2 × length. Forefemoral notch glabrous, compressed but not crest-like. Forebasitarsus without preapical spines on outer margin; outer apical spine of foretarsomere II markedly shorter than foretarsomere III. Sternum VIII tridentate apically (Fig. 98g), median tooth rudimentary in small individuals. Length 4.3–7.9 mm. Volsella and penis valve: Fig. 99.

DIMORPHIC MALES.— Not included in the Description above are many African males in which the trimmal carina is broadly reduced distad of the tooth (but contrastingly sharp in the apical third or so), without cleft, and the tooth itself is prominent (Fig. 98b). I could not correlate this unusual mandible with any other feature. Specimens with reduced trimmal carina mostly have a non-thickened flagellum with a rudimentary rather than well-defined sulcus, and the unsculptured area of the lower frons does not extend orbit to orbit, but both conditions are also found in the main form. Their mandibles may be nearly all black, but they are reddish mesally in some specimens, just as in the main form. In addition, the two males from Niakaramandougou, Ivory Coast, are somewhat intermediate in shape. The associated females are morphologically identical to those of the main form but differ by their darker mandibles. These specimens occur in Ethiopia (35 km N Moyale), Ivory Coast (all specimens examined), Kenya (40 km S Kajiado, Kakamega Forest, Karen, Magadi road 25 air km SW Nairobi, 5 km N Namanga), and Zimbabwe (Chimanimani). They were found together with the main form 40 km S Kajiado and on Magadi road. I conclude that they are just an individual variation of *consocius*.

This variety closely resembles *congoensis* except that the mesopleural setae are straight (angled apically). In *congoensis*, most mesopleural setae are sinuous, and I have not observed intergradation.

VARIATION.— *Tachysphex consocius* varies in frontal and mesopleural sculpture, setal length, and setation of the male antenna. Variation is partly geographic and partly individual.

Frons sculpture. The frons has well-defined punctures above the antennal socket; the upper frons is punctate in most specimens, with the interspaces ridged or conspicuously microsculptured. In some specimens, however, either the punctures of the upper frons are evanescent or the microsculpture between them is reduced. These types are found throughout most of the species range, and all three are found simultaneously in many localities.

Sculpture of lower frons. The lower frons, in most specimens, is sculptured as average for the genus. Many southern and eastern African specimens, and also some from Mali, have an unsculptured area that extends from the supraantennal swelling to orbit (Fig. 97b). The size of the unsculptured area varies within the same population. For example, it is rudimentary in a female from

Seronera, Tanzania, and extends almost to orbit in another.

Mesopleural punctures. Mesopleural punctures are either nearly as large as scutal punctures or markedly smaller, minute. They are large anteriorly and fine posteriorly in many specimens and all minute in most specimens from southwestern Europe. Large punctures are about one diameter apart and smaller punctures up to several diameters apart.

Setal length, expressed as a fraction of midocellar diameter, is 1.0–1.5 on postocellar area, 1.0–1.2 on scutum anterolaterally, and 0.3–1.5 on midfemoral venter. Specimens with short setae are relatively common in the Mediterranean basin east to Turkmenistan and Tajikistan. Specimens with both short and long femoral setae (Figs. 97c, d) may occur within the same population, e.g., near Samba Dia, Senegal.

Male antennae. Flagellomeres II–V are mostly thicker than VII–XI, but the difference is minimal in small specimens from most areas and in medium-size specimens from Kenya. The dorsal groove of flagellomeres III–XI (separating two differently setose areas) is well defined in most specimens (Figs. 98c–e), but the groove is rudimentary in some specimens and absent in many males from Kenya (in which the flagellum is uniformly setose).

Nesting behvior.— Nesting habits of *consocius* were studied by Asís, Gayubo, and Tormos (1989) in Spain and by Krombein (*in* Krombein and Pulawski, 1994) in Sri Lanka. Nesting areas were horizontal, without vegetation or with sparse vegetation. The nests were unicellular and varied in length from 3 cm in Sri Lanka to 8–10 cm in Spain; they ended about 1.5 cm (Sri Lanka) to 3–4 cm (Spain) below the soil surface. The nest entrance was left permanently open during the provisioning period. Prey consisted of small acridid nymphs that were transported in flight; the only prey observed in Sri Lanka was *Spathosternum prasiniferum* Walker (Acrididae, Hemiacridinae). The Sri Lankan wasp entered the burrow headfirst, turned around inside, reached out of the burrow and, with some difficulty, dragged in the grasshopper nymph. One fully provisioned nest (Spain) contained eight prey (small acridid nymphs), another incompletely provisioned nest held three prey. An egg was found on the ventrolateral part of prey immediately behind the forelegs. Both males and females (Spain) spent the night in short galleries in the ground that they dug shortly before sunset. Additionally, a female from Grahamstown, South Africa (AMG), is pinned with her prey, a lentulid grasshopper (det. F.W. Gess).

Geographic distribution (Fig. 100).— Entire continental Africa, Europe north to southern France, Czech Republic, and southern Russia (Volgograd area), southwestern Asia (Arabian Peninsula, Syria, Turkey, Iran), Kazakhstan (north to Oral), Transcaspia (Uzbekistan north to Tashkent, Turkmenistan, Tajikistan), Afghanistan, Mongolia, India, Nepal, and Sri Lanka.

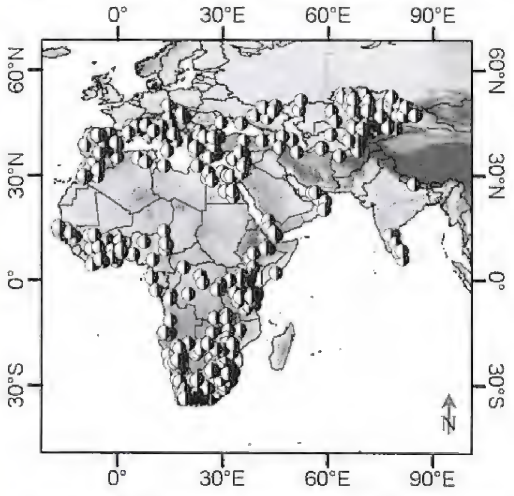

Figure 100. Collecting localities of *Tachysphex consocius*.

Records.— **AFGHANISTAN**: **Herat**: Bala Murghab (de Beaumont, 1970a). **ALGERIA**: Biskra (1 ♀, CU), Bou Hanifia (1 ♀, CU). **ANGOLA**: Bruco (3 ♀, BMNH), Roçadas (1 ♀, BMNH), 3 mi N Sanga Comba (3 ♀, 1 ♂, BMNH), Tundavala 8–10 mi NW Sa da Bandeira (1 ♂, BMNH). **ARMENIA**: Erivan area (Pulawski, 1971). **AUSTRIA**: **Burgenland** (Dollfuss, Gusenleitner, and Bregant, 1998:map79). **Niederösterreich**: Piesting (Pulawski, 1971), Stammersdorf

(Pulawski, 1971), St. Christofen (Dollfuss, 1987). **Steiermark**: Therme Loipersdorf at 46°59′N 16°07′E (Gusenleitner, 1992). **Wien**: Donau-Auen, Türkenschanze (Zettel, Gross, and Mazzucco, 2001). **AZERBAIJAN**: Khanlar (1 ♀, NHMW, holotype of *consocius*), Kuduly in Nukha District (Pulawski, 1971). **BOTSWANA**: Kuke Pan (1 ♂, BMNH), Lake Ngami 12 mi NE Sehithwa (2 ♀, BMNH), Linyanti Marsh (1 ♀, 1 ♂, BALDOCK), Moremi Wildlife Reserve 50 km N Maun (1 ♀, OHL), Serowe (5 ♀, 16 ♂), Serowe: Farmers Brigade (1 ♂, PPRI). **BULGARIA**: Aytos (1 ♀), Damyanitsa 8 km S Sandanski (1 ♀), Knyazhevo near Sofia (1 ♂), Kresna Gorge at 41°48′N 23°10′E (Ivanov and Ljubomirov, 2001), Mt. Vitosha near Sofia (Ljubomirov, 1999, 2001), Ropotamo River mouth (1 ♀), Sandanski (1 ♀, 1 ♂), Slanchev Bryag near Nessabar (1 ♀), Sozopol (2 ♀, 2 ♂). **BURKINA FASO**: Boromo (1 ♂, FSAG), Diébougou (1 ♀, FSAG), Kompienga 20 km S Pama (1 ♀; 12 ♀, 3 ♂, LEM). **CAMEROON**: **Extrême-Nord**: 40 km S Maroua (1 ♂), ca 10 km W Mokolo (1 ♀). **Nord**: 15 km W Campement des Eléphants and 67 km S Garoua (1 ♂). **Ouest**: Bamenda (1 ♀, BMNH). **CONGO**: Brazzaville (1 ♂, MSNT), Djoué 17 km W Brazzaville (4 ♀, 1 ♂, MSNT). **CROATIA**: Uglian Island: Preko (Pulawski, 1971). **CYPRUS**: Akrotiri Bay (Pulawski, 1971), Cherkes (de Beaumont, 1947b), Famagusta (1 ♀), near Kolossi (2 ♂), Limassol (1 ♂), Yermasoyia River (3 ♀, 4 ♂), Zakaki (de Beaumont, 1947b). **CZECH REPUBLIC**: Modrany (Pulawski, 1971). **EGYPT**: **Al Fayyum**: Kom Osheim (3 ♀, 7 ♂). **Al Iskanderiyah** (= Alexandria): Amrye (de Beaumont, 1966). **Al Jizah** (= Ghiza): Abu Rawash (1 ♀, 2 ♂), Dahshur (1 ♀, 1 ♂), Ghiza (1 ♀, 1 ♂), Manshiet Radwan (1 ♀). **Al Qahirah** (= Cairo): Cheikh Fadl (de Beaumont, 1940), Doqqui: Orman Park (1 ♀, FSCA), Gebel Asfar (de Beaumont, 1940), Helwan (de Beaumont, 1940), Maadi (3 ♂). **Al-Uksur** (= Luxor): near Medinet Habu temple 3 km W Luxor (5 ♀, 5 ♂; 1 ♀, SCHL). **Al-Wadi al-Jadid**: Khamissa, Kharga oasis: Al-Kharga (1 ♀); Sitra, Siwa oasis (de Beaumont, 1950b). **As Suways** (= Suez): 18–25 km W Suez (Pulawski, 1971). **Aswan**: Aswan (5 ♀, 6 ♂). **ETHIOPIA**: **Gamo Gofa**: 58 road km NNE Arba Minch (1 ♀), Awasa (1 ♂, MSNT), W shore of Lake Chamo (1 ♀, 1 ♂), 49 road km SE Sodo (2 ♀, 2 ♂; 1 ♀, 1 ♂, AAU). **Harerge**: 37 km SE Jijiga (1 ♀), 43 km SE Jijiga (1 ♀), Rock Valley near Harer (1 ♀, USNM). **Shewa**: Langano (1 ♀, 1 ♂, OHL), Ziway (2 ♀). **Sidamo**: 35 km N Moyale (1 ♂). **FRANCE** (from Bitsch et al., 2001, or as indicated): **Corse**: Ajaccio (1 ♂), Bastia Pineto (Gayubo, Borsato, and Osella, 1992), Calvi, Propriano (de Beaumont, 1936a). **Drôme**: Dieulefit (Pulawski, 1971). **Gard**: Grau-du-Roi. **Hérault**: Sérignan-plage. **Lozère**: Saint-Etienne. **Pyrénées-Orientales**: Baillaurie (Nouvel and Ribaut, 1958), Banyuls-sur-Mer (de Beaumont, 1936a). **Var**: Gonfaron, La Môle, Ollioules, Saint-Aygulf (Pulawski, 1971), Toulon. **Vaucluse**: Carpentras (4 ♀, 3 ♂), Roussillon. **GABON**: Nzogbour (1 ♀, FSAG), Tchibanga (1 ♂, FSAG). **GHANA**: Aburi (2 ♀), Accra near beach (1 ♀, 1 ♂), Breku 40 km E Kononga (2 ♀), Buipe (1 ♂), Kawampe 45 km N Kintampo at 8°30′N 1°35′W (2 ♂), Kumasi (3 ♀, BMNH). **GREECE**: **Aegean Islands**: Rhodes: Empona (1 ♂), Kolimbia at Loutani River (1 ♀, 1 ♂, CSE), Kremasti (de Beaumont, 1960a). **Ionian Islands**: Corfou (de Beaumont, 1965). **Kriti** (= Crete): Ayia Varvara (de Beaumont, 1961a), Heraklion (de Beaumont, 1965), Karteros (1 ♀), Knossos (1 ♀), Sitia (de Beaumont, 1965). **Pelopónnisos** (de Beaumont, 1965): Corinth, Kalamata, Mega Spileon, Zachlorou. **Thrace**: Komnina Stavropoulis W Xanti (Schmidt and Westrich, 1983). **HUNGARY**: Kiskunság National Park (Karsai, 1988), Simontornya (de Beaumont, 1965). **INDIA**: **Andra Pradesh**: 9 km E Palmaner (1 ♂). **Karnataka**: Bangalore (1 ♀, 1 ♂, RTST; 2 ♂, ZMUC). **Tamil Nadu**: Thanjavur = Tanjore (1 ♂, USNM). **IRAN**: **Azerbaijan**: Tabriz (Pulawski, 1971). **Mazanderan**: coastal plain between Chalus and Shahsavar (2 ♀, 1 ♂). **ISRAEL**: 135 km N Elat Iddan (5 ♀, 2 ♂, CSE), Hazeva in Arava Valley at 30°46.88′N 35°14.56′E (1 ♂, CSE), Hazeva Field School in Arava Valley (1 ♀, 1 ♂, CSE), Iddan in Arava Valley (3 ♀, 2 ♂, CSE), Jerusalem: Hebrew University Botanical Garden (1 ♀, UCD), Moshaav Hazeva at 30°46.33′N 35°16.32′E (1 ♀, 2 ♂, CSE), Shizaf Nature Reserve near Hazeva in Arava Valley (2 ♀, CES). **ITALY**: **Calabria**: Capo Spulico (Pagliano, 1990). **Campania**: Porto d'Ischia (Erlandsson, 1974). **Emilia-Romagna**: Collina di Pistoia (de Beaumont, 1965), Gaibola (de Beaumont, 1965), Grizzana (de Beaumont, 1954a), Montetortore (Grandi, 1954), Rimini (de Beaumont, 1954a), Ronzana (de Beaumont, 1965). **Lazio**: Campo Ascolano (Pagliano, 1980), Pontecorvo (Pulawski, 1971), Roma (Pagliano, 1990), Tor Vajanica (Pagliano, 1980). **Piemonte**: Ceva (Pagliano, 1990). **Puglia**: Gargano (Grandi, 1957). **Sicilia**: Gela (Pulawski, 1971). **Toscana**: Isola d'Elba (de Beaumont, 1954b). **IVORY COAST**: Abidjan: Cocody (1 ♀, MSNT), Adiopodoumé (1 ♀, ZMAN), Bouaké (1 ♀, RMNH; 1 ♂, UCD), Bouaké: Foro-foro (2 ♀, UCD), 30–35 km N Korhogo (14 ♀, 11 ♂, ZMAN), 56 km N Niakaramandougou (2 ♂), 40 km S Odienné (2 ♀, MSNT), Oumé (1 ♀), Ouro 40 km W San Pédro (1 ♀; 1 ♂, MSNT), 10 km N San Pédro (2 ♀, 2 ♂), Sinématiali 23 km W Ferkessedougou (2 ♀), 20 km S Soubré

(1 ♀), Tabou (1 ♀, FSAG), 40 km S Toumoudi (2 ♀, 1 ♂). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Almaty**: 10 km S, 12–16 km SW, and 20 km W Almaty (K), Almatinskiy Nature Reserve (Kazenas and Esenbekova, 2001), Altynemel' Range 80 km SSE Taldy-Kurgan (K), Arkharly Range at about 44.3°N 77.5°E (K), Bakanas (K), 20 km W and 45 SW Chundzha (K), Kaskelen River 50 km N Almaty (1 ♀, 2 ♂), mouth of Kurty River (K). **Astana**: 26 km NE Astana (K), 20–60 km N Derzhavinsk at about 51.5°N 66°E (K), Ishim River (K), 40 km SE Kökshetaū (K), 15 km S Priozernoye (K), Tersakkan River near Kökshetaū W Astana (1 ♀), Zhaksy at about 52°N 67.5°E (K). **Aqtöbe**: 30 km SW Yrghyz (K). **Atyraū**: Kharkin 180 km N Atyraū (1 ♂). **East Kazakhstan**: Aktogai 100 km SW Ayaguz (K), 5 km N and 38 km SE Aktogai (K), 46 km E, 20 km N, 5 km S, 9–40 km W, and 33–96 km SW Ayaguz (K), 13 km NW village Dolon' (K), 15 km NW Gheorghievka at about 49.5°N 81°E (K), 75 km SW Gheorghevka (K), 90 km N and 46–54 km NE Kaynar (K), 40 km S Kyzil-Kesik 120 E Ayaguz (K), 47 km SW Öskemen (K), 7–10 km N and 8 km NW Semey (K), 5 km SW and 20–25 km NW Tansyk (K), 33 km NE and 40 km S Tarbagatay (K), 15 km E and 20 km S Zaysan (K). **North Kazakhstan**: 40 km SE Kökshetaū (K), Ruzaevka (K), Stavropolka (K), 23 km NW Stepnyak (K), 10 km NW Yesil (K). **Pavlodar**: 70 km SW Bayan-Aul (K), Lebyazhe (K), 70 km N Lebyazhe (K), Shcherbakty (K). **Qaraghandy**: 110 km NE Balqash (K), 22–55 km SW Karkaralinsk (K), Koksenghir near Zhana-Arka = Atasuskiy (1 ♀), 6–8 km NW Kyzylzhar (1 ♀), Lake Koskol' at about 49.5°N 67°E (K), Taly Manak shores S Zhana-Arka (P), Ulytau at about 48.7°N 67°E (1 ♀), 20 and 53 km W Zhanaarka = Atasuskiy (K), 60 km E Zhezqazghan (K), 150 km E Zhesqazghan (P). **Qostanay:** Aman-Karagay 100 km SSE Qostanay (K), 150–180 km E Qostanay (K), 10 km NE Qostanay (K), Semiozernoye (K), 25 km SE Semiozernoye (K), Shili at about 50°N 66°E (K). **Qyzylorda**: 6 km W village Amanotkel' on Syr-Darya River at about 46°N 61.5°E (1 ♀), Balamurun near Dzhulek (P), Dzhulek = Chiili (K, P), 15 km S Kazalinsk (K), 3 km S Yany-Kurgan (K). **South Kazakhstan**: 30 km W Bairkum at about 42°N 67°E (K), Koksu at about 41.5°N 68°E (K), 30 km W Koksu (K), 5 km E Novostroyevka at about 42°N 70°E (K), Otrar at about 43°N 67°E (K), 15 km S Pervomayskoe 70 km SE Chimkent (K), 4 km W Sary-Agach (K), 30 km NE Suzak (K), 3 km S Yany-Kurgan (K). **West Kazakhstan**: Yanvartsevo 65 km N Oral (1 ♂). **Zhambyl**: 18–27 km Akyr-Tube (K), 30 km SW Chu (K), 60–70 km N, 4 km NE, and 50–90 km NW Furmanovka (K), 40 km NW Karatau on Koktal River at about 43.5°N 70°E (K), Togusken at 43°36′16″N 67°24′14″E (K), 50 km SW Ulanbel' village in Muyun-Kum sands (1 ♂), 5 km SE and 64 km W Zhambyl (K), Zhanatas at 43°34′00″N 69°45′00″E (K). **Location unknown**: Lugovoy (K), 12 km N Sary-Ozek (K). **KENYA**: **Central Province**: Chania Falls near Thika (1 ♂). **Coast Province**: Diani Beach in Kwale District (2 ♂; 2 ♀, MCZ), Karacha forest in Kilifi District (2 ♂), Mombasa (1 ♂, USU), Taita Discovery Centre (1 ♀, 1 ♂), ca 10 km N Taita Discovery Centre (1 ♀), Tiwi Beaches (1 ♂), Voi (1 ♀, 2 ♂), 2 km S Voi (2 ♀, 9 ♂), Voi area (1 ♂, OÖLM), Wundanyi (4 ♀, 3 ♂, OÖLM). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (4 ♀, 3 ♂), Laisamis (1 ♀), 94 km E Thika (6 ♀, 4 ♂). **Nairobi**: Karen (14 ♀, 11 ♂), Nairobi (1 ♀, MNHN). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♀, 6 ♂), 5 km S Kajiado (1 ♂), 40 km S Kajiado at 2°09.1′S 36°47.2′E (3 ♂), Magadi road 25 air km SW Nairobi (1 ♀, 5 ♂), Magadi road 46 air km SW Nairobi (10 ♂), Marich Pass Field Studies Centre (15 ♀, 11 ♂), Matembur in West Pokot District (5 ♀, 1 ♂, PMA), Naivasha (1 ♀, BMNH), ca 5 km N Namanga (1 ♀, 1 ♂), 10 mi S Nanyuki (1 ♂, USNM), 12 mi E Narok (1 ♀), Naro Moru (3 ♀, 1 ♂; 1 ♀, ZMUC), Ngong Forest Station 6 mi S Nairobi (2 ♀, USNM), Njabini 25 km E Naivasha (1 ♀, ZMAN). **Western Province**: Kakamega Forest Reserve (2 ♀, 7 ♂). **LEBANON**: Cedars (1 ♀). **LESOTHO**: Mamathes (20 ♀, 6 ♂, AMG; 2 ♀, 2 ♂, BMNH), Teyateyaneng (1 ♂, AMG). **LIBYA**: **Cyrenaica**: Wadi Derna (de Beaumont, 1960b). **Tripolitania** (de Beaumont, 1956a): Gargaresc, Giado, Jefren, Tagiura. **MALAWI**: Monkey Bay 35 km SE road to Mangochi (1 ♀, PMA), Mulanje Mountain in Likabula River Valley (1 ♀, PMA). **MALI**: 30 km N Bamako (2 ♀; 1 ♀, MS), 60 km SW Ségou (1 ♂, MS). **MOROCCO** (Pulawski, 1971, or as indicated): Agadir (de Beaumont, 1955), 32 km S Ain Leuh (1 ♂, CSE), Asni, Azemmour, Casablanca, Fedhala, Goulimine (de Beaumont, 1955), Ijoukak (de Beaumont, 1955), Kenitra, Marrakech: Oued Tensift (1 ♀), Mehdia near Kenitra (de Beaumont, 1955), Mhamid 80 km S Zagora in Draa Valley (1 ♀, 1 ♂, CSE), Oued Adoudou, Tafraout (de Beaumont, 1955), Tinerhir, Tiznit: Oued Massa, Val du Riz. **MOZAMBIQUE**: Inhaca Island at 26°01′S 32°58′E (1 ♀, PPRI). **NAMIBIA**: **Gobabis District**: 40 km N Witvlei (1 ♀). **Grootfontein District**: Meteorite (1 ♀, MS). **Karibib District**: Ameib Farm 19 mi NW Karibib (1 ♀, BMNH), 43 km E Karibib (1 ♂), 5 mi N Usakos (1 ♂, BMNH). **Khorixas District**: Brandberg: Hungorob Valley at 21°11.40′S 14°31.69′E (1 ♂, SAM), Messum Valley (1 ♀, 2 ♂, SAM), and

Wasserfallfläche at 21°10.77′S 14°32.87′E (1 ♀, SAM, determined as Species 1 and 3 by van Noort, Prinsloo, and Compton, 2000), 117 km from Swakopmund on road to Usakos (1 ♀, AMG). **Mariental District**: 65 km S Mariental (1 ♀). **Okahandja District**: Okahandja (1 ♀, MS), ca 30 km W Okahandja (1 ♂, OHL). **Otjiwarongo District**: Okosongomingo Farm 50 km ESE Otjiwarongo (1 ♀, LACM), 20 km NE Otjiwarongo (1 ♀, MS). **Rehoboth District**: Kalkrand (1 ♀, FSCA), 23 km N Rehoboth (1 ♀; 1 ♀, MS), 9 km S Rehoboth (1 ♀). **Rundu District**: Takuasa (1 ♀, NMN). **Swakopmund District**: Kuiseb River at Gobabeb (1 ♀, PMA), Namib Desert Research Station (1 ♀, USU). **Tsumeb District**: Halali in Etosha National Park (2 ♀, 2 ♂, PPRI), 30 km E Namutoni (1 ♀), Onguma Farm 55 mi NW Tsumeb (1 ♀, BMNH), 10 km SE Tsumeb (2 ♂, MS). **Windhoek District**: 2 km S Aris (1 ♂), Regenstein 15 mi SSW Windhoek (1 ♀, BMNH), Windhoek (1 ♀, BMNH), 8 km S Windhoek (1 ♀, FSCA), 60 km E from road C14 on C26 (1 ♀, AMG). **NEPAL**: **Chitwan District**: Sauraha in Chitwan National Park at 27°34′N 84°29′E (1 ♀, CSE). **NIGER**: **Diffa Region**: 12 km ENE Nguigmi at 14°18.9′N 13°13.2′E (1 ♀). **NIGERIA**: Ibadan (1 ♀, 1 ♂; 1 ♀, 9 ♂, BMNH; 5 ♀, 1 ♂, CNC), Ile-Ife at 7°28′N 4°34′E (2 ♀, 1 ♂, AEI; 1 ♂, BMNH), Kufena Inselberg ca 3.5 mi SW Zaria (1 ♀, USNM). **OMAN**: Al Khuwayr at 23°36′N 58°26′E (2 ♀, 2 ♂; 5 ♀, 2 ♂, PMA), Masirah Island (Guichard, 1980), Rostaq (Guichard, 1980), Tinaf (1 ♀, KMG). **PORTUGAL**: Cascais (Diniz, 1959), Lisboa (Diniz, 1959), Paço de Rei (Diniz, 1959), Resende (Pulawski, 1971), Setubal (Pulawski, 1971), Trafaria near Lisboa (2 ♂). **El Algarve Province** (Gayubo, 1984): Aldeia da Tor, Aljezur, Bensafrim, Olhão, Porta de Lagoa, S. Bartolomeu de Messines. **ROMANIA**: C.A. Rosetti in Danube delta (Scobiola-Palade, 1985). **RUSSIA**: **Rostov Oblast'** (Minoranskiy and Shkuratov, 1996): Beglitskaya Kosa, Migulinskaya, Nedvigovka, Rostovskiy Nature Reserve at 46°27′N 42°41′E (Shkuratov, 2002), Vëshenskaya village area at 49°37′N 41°45′E (Shkuratov, 2000). **Volgograd Oblast'**: Kamyshin near Sarepta (Pulawski, 1971), Sarepta, now Krasnoarmeysk (1 ♂). **SAUDI ARABIA**: Fayfa (1 ♀, KMG). **SENEGAL**: 5 km SW Diourbel (3 ♂), 16 km N Fatick (1 ♂), Kédougou (1 ♀, FSAG), Ndangane 45 air km SE Mbour (1 ♀), 3 km W Samba Dia = 70 air km W Kaolack (3 ♀, 17 ♂; 2 ♀, 11 ♂, MSNT), Tambacounda (1 ♂), 5 km SW Thiès (3 ♀, 1 ♂; 3 ♀, 4 ♂, MSNT), Tiougoune (4 ♀, 1 ♂, FSAG). **SLOVAKIA**: Chotin (Pulawski, 1971). **SOMALIA**: Afgoi (3 ♂; 3 ♀, 4 ♂, RMNH). **SOUTH AFRICA**: **Eastern Cape Province**: 10 km SE Alexandria (16 ♀, 12 ♂, OÖLM), Algoa Bay (2 ♀, TMP), Aliwal North (4 ♀, 1 ♂, BMNH; 1 ♀, 1 ♂, PPRI), NNW Bedford at 32°33′S 26°00′E (1 ♂), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (6 ♀ 2 ♂, AMG), 7 km S Cradock (1 ♂, OÖLM), Elandsheuwels Farm 40 km W Steytlerville (10 ♀, USU), Goodehoop Farm 16 km W Steytlerville (1 ♀, 2 ♂, USU), Grahamstown (2 ♂, AEI; 10 ♀, 3 ♂, AMG; 2 ♀, 2 ♂, PPRI; 2 ♀, 2 ♂, PMA; 1 ♀, SAM), 2 mi NW Grahamstown (1 ♀), Grahamstown: Burnt Kraal (1 ♀, AMG), 18 km WNW Grahamstown: Hilton Farm (13 ♀, 11 ♂, AMG), Howison's Poort 6 km WSW Grahamstown (6 ♀, 4 ♂, AMG), Katberg (1 ♂, BMNH), Kenton-on-Sea (5 ♀, AMG), Kirkwood (2 ♀, 2 ♂, OÖLM), Komga (1 ♂, PPRI), Olifantskop Pass 30 km W Grahamstown (1 ♀, 10 ♂, OÖLM), 20 km W Paterson (1 ♀, OÖLM), Pearston (1 ♀, AMG), Retrivier Mtn. near Port Alfred (1 ♀, AMG), Rietbron (1 ♀, AMG), Rooikrans Dam 30 km NW King William's Town (2 ♂, OÖLM), Somerset East (1 ♀, AEI), Steynsburg Division (1 ♀, SAM), 2 km N Steytlerville (1 ♂, USU), 3 km N Steytlerville (1 ♀; 4 ♂, USU), 6 km N Steytlerville (1 ♂, CSE; 33 ♀, 26 ♂, USU), 16 km W Steytlerville: Goodehoop Farm (1 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (7 ♀, 20 ♂, USU), Strowan Farm 5 air km W Grahamstown (5 ♀, 5 ♂, AMG), Table Farm 10 km NW Grahamstown (3 ♀, 10 ♂, AMG), Umtata (1 ♀, BMNH), Waaipoort Pass 19 km ENE Steytlerville at 33°14.8′S 24°19.8′E (1 ♀; 1 ♀, USU), Willowmore (5 ♀, 1 ♂, TMP), 43 km NE Willowmore: Plessierivier (2 ♀, 1 ♂), 37 km NW Willowmore in Grootrivierberg Range (2 ♂; 51 ♀, 68 ♂, USU), 6 km S Willowmore at 33°20′S 23°27′E (1 ♂). **Free State**: Adullam Farm near Clarens at 28°32′S 28°28′E (2 ♀, 3 ♂, PPRI), Caledon River between Bethulia and Aliwal North (1 ♀, SAM), Clocolan (1 ♀, AMG), Harrismith (2 ♀, BMNH), Kroonstad (1 ♀, AMNH), Tussen Die Riviere Game Reserve (5 ♀, 3 ♂, PPRI). **Gauteng**: Discovery (1 ♀, 1 ♂), Pretoria (1 ♂: 1 ♀, 2 ♂, AMG; 4 ♂, AEI; 1 ♀, PPRI), Pretoria Botanical Garden (1 ♂), Pretoria: Faerie Glen at 25°46′S 28°17′E (1 ♀), Pretoria: Gardens of Union Buildings at 25°45′S 28°12′E (7 ♀, 10 ♂, PPRI), Pretoria: Hennops Park at 25°55′S 28°09′E (1 ♀, PPRI), Pretoria: Lynnwood at 25°48′S 28°22′E (1 ♀, 1 ♂, PPRI), Rietvlei (= van Riebeck) Nature Reserve at 25°52′S 28°16′E (1 ♀, 1 ♂), Roodeplaat (1 ♀, PPRI), Roodeplaat Horticultural Research Station at 25°37′S 28°20′E (2 ♂, PPRI), Schoemansville (1 ♀, AMG), Struben's Valley (1 ♀, 2 ♂, AMG), Tswaing (2 ♂; 1 ♀, 3 ♂, PPRI). **Kwazulu-Natal**: Bergville (1 ♂, OÖLM), Dundee (1 ♀, AMG), Giant's Castle National Park in Drakensberg Mts. (1 ♀, CSE), Hluhluwe Game Reserve (1 ♀, 2 ♂,

AEI; 6 ♀, 2 ♂, PMA), Karkloof near Howick (1 ♀, AEI), Kloof (1 ♀, BMNH), Kuleni Farm near Hluhluwe at 27°54′S 32°22′E (3 ♂, PPRI), Mtamvuna Nature Reserve (1 ♀, PMA), Mtunzini 1.5 km E Umlalazi Nature Reserve (4 ♀, PMA), Natal National Park (1 ♂, AEI), Ndumu Game Reserve (1 ♂, PMA; 2 ♂, UCD, USU), Pietermaritzburg (2 ♀, 5 ♂, UCD), Pietermaritzburg: Townbush (1 ♀, PMA), 5 km W Port Shepstone (1 ♀, USNM), Santa Lucia (1 ♀, ZMAN), St. Lucia Estuary (1 ♂, AEI), St. Lucia: Fannies Island Camp at 28°10′S 32°25′E (4 ♀, 1 ♂, PPRI), Sodwana (1 ♀, PMA), Ukulinga Reserve Farm 10 km SE Pietermaritzburg (7 ♀, 1 ♂, PMA), Umfolozi Game Reserve (4 ♀, 2 ♂, PMA), Utrecht (1 ♀, OÖLM), Van Reenen (1 ♀, BMNH). **Mpumalanga**: Barberton (18 ♂, PPRI), Bergvliet Forest Reserve at 25°05′S 30°54′E (4 ♀, 5 ♂, PPRI), Loskop Dam Nature Reserve (13 ♀, 17 ♂, PPRI), Mariepskop at 24°35′S 30°52′E (1 ♂, PPRI), Middelburg (1 ♀, PPRI), 11 km E (1 ♂, PMA) and 11 km SE Pilgrim's Rest (2 ♀, 3 ♂, PMA), Pretoriuskop in Kruger National Park (1 ♀, USNM), Satara in Kruger National Park (4 ♂, PMA), Skukuza in Kruger National Park (5 ♂, PPRI; 3 ♀, 8 ♂, PMA), Waterval-Onder (1 ♀, 1 ♂, AMG), Weltevreden at 25°34′S 31°10′E (4 ♀, 2 ♂, PPRI). **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♀, 3 ♂, PPRI), W Calvinia (1 ♂, OÖLM), Dassiefontein Farm 14 road km E Kamieskroon (1 ♀, 4 ♂; 5 ♀, 4 ♂, PPRI), Doringrivier N Nieuwoudtville at 31°18′S 19°07′E (1 ♂, PPRI), Garies (1 ♀, 2 ♂, AEI), 5 km E Garies at 30°37′27″S 17°59′45″E (1 ♂, CSE), Goegap Nature Reserve 10 mi E Springbok (1 ♀, 5 ♂, AMG), 25 km E Hondeklipbaai (1 ♂, OÖLM), SW Loeriesfontein (1 ♂, OÖLM), Olifantshoek at 27°57′S 22°48′E (1 ♀, 1 ♂, PPRI), Richtersveld National Park at 28°10′S 17°02′E (1 ♂, AMG), Sors Sors 9 km NE Kamieskroon (1 ♀, AMG), Springbok (1 ♀, KU), Upington (2 ♀, AMG), Vioolsdrif (1 ♀, AMG), Witsand Farm near Roaring Sands at 28°32′S 22°30′E (2 ♀, 2 ♂, PMA). **Northern Province**: Altyddroog Farm 13 km W Beitbridge at 22°11′S 29°53′E (20 ♂, PPRI), Buffelspoort Dam (1 ♀, AMG), D'Nyala Nature Reserve (6 ♀, 6 ♂, PPRI), Duiwelskloof at 23°42′S 30°06′E (7 ♀, 13 ♂, PPRI), Entabeni Forest Reserve at 23°00′S 30°16′E (1 ♀, 2 ♂, PPRI), Fanie Botha Nature Reserve near Tzaneen at 23°50′S 30°10′E (1 ♀, 1 ♂, PPRI), Gravelotte 20 km NW Beacon Ranch (2 ♂, PMA), Guernsey Farm 15 km NW Klaserie (21 ♀, 23 ♂, PMA), Klaserie (1 ♀, 2 ♂, PMA), 15 km E Klaserie (6 ♀, 12 ♂, PMA), 20 km E Klaserie (2 ♀, 2 ♂, PMA), Hans Merensky Nature Reserve at 23°40′S 30°39′E (1 ♂, PPRI), Langjan Nature Reserve (5 ♂, PPRI), Modjadji Nature Reserve (2 ♀, 6 ♂, PPRI), Mogol Nature Reserve (5 ♀, 6 ♂, PPRI), Mogoto Nature Reserve near Zebediela (1 ♀, 8 ♂, PPRI), Nylsvley Nature Reserve (1 ♂; 2 ♀, 2 ♂, PPRI), Pafuri (7 ♀, 15 ♂, PPRI; 1 ♀, 1 ♂, PMA), Thabazimbi: Ben Alberts Nature Reserve at 24°37′S 27°23′E (3 ♀, 3 ♂, PPRI), Tzaneen (1 ♀, AEI), 5 km N Warmbad (1 ♀, USNM), Wylliespoort at 22°58′S 29°57′E (3 ♀, 5 ♂, PPRI). **North-West Province**: Lichtenburg (1 ♂, TMP), Rustenburg Nature Reserve (2 ♂; 10 ♀, 13 ♂, PPRI), Swartruggens (1 ♀; 2 ♀, 1 ♂, AMG), VanWyksfontein 8 km W Norvalspont (4 ♀, 3 ♂, AMG). **Western Cape Province**: Barrydale (1 ♀, OÖLM), Beaufort West at 32°20′S 22°30′E (3 ♀, 30 ♂, PPRI), Bergville (1 ♂, OÖLM), Biedouw Valley at 32°08′S 19°14′E (2 ♂, PPRI), Cape Peninsula: Camps Bay (1 ♀, BMNH), Cape Town including Milnerton (1 ♀; 1 ♀, BMNH; 7 ♀, USNM), Cape Town: Constantia (1 ♀, USU), Cape Town: Constantiaberge, 640 m alt., at 34°02′S 18°23′E (2 ♀, 1 ♂, SAM) and Constantiaberge above Tokai Forest and Donkerbosksloof, 460 m alt., same coordinates (10 ♀, 3 ♂, SAM), Cape Town: Table Mountain (3 ♀), 60 km N Cape Town (3 ♂, OÖLM), Cederberg (1 ♀, RMNH; 1 ♀, 2 ♂, USU), Ceres (1 ♀, BMNH), 20 km N Citrusdal (2 ♂, OÖLM), Clanwilliam (1 ♀, SAM), 40 km E Clanwilliam: Sevilla (2 ♀, 1 ♂, USU), 5 km (1 ♂, AMG) and 11 km (1 ♀, 1 ♂, AMG) W Clanwilliam, 11 km W Clanwilliam: Ysterfontein Farm (5 ♀, 2 ♂, USU), Greyton (3 ♀, 11 ♂, OÖLM), Kirstenbosch (1 ♀, 1 ♂, AEI), Knersflakte: Kalkgat (8 ♀, 3 ♂, OHL), Knysna (1 ♀, PPRI), Ladysmith (1 ♀, 1 ♂, AMG), S Lambert's Bay (4 ♀, 4 ♂, OÖLM), Langberg (1 ♀, OÖLM), Matjiesfontein (1 ♂), Mossel Bay (4 ♀, 6 ♂, BMNH), Pakhuis Pass 13.5 km ENE Clanwilliam at 32°08′18″S 19°01′14″E (1 ♀, CSE), Plettenberg Bay (1 ♂; 1 ♀, USNM), Raubenheimer Dam near Oudtshoorn (1 ♀, AMG), Sewenweekspoort in Ladysmith District (1 ♀, 1 ♂; 1 ♀, UCD), Stellenbosch (1 ♀), Stellenbosch: Jonkershoek (14 ♀, 15 ♂, PMA), Swellendam (1 ♂, FSCA), 30 km NE Vanrhynsdorp at 31°26.7′S 18°58.4′E (2 ♀), Wellington: Rooshoek (5 ♀, 4 ♂; 20 ♀, 16 ♂, RMNH), Worcester (3 ♀, BMNH; 1 ♂, UCD), 24 km W Worcester (1 ♂, USU). **SPAIN**: **Albacete** (Tormos, Asís, and Gayubo, 1994): Alatoz, Jardín. **Alicante** (Torregrosa, Gayubo, Tormos, and Asís, 1993, or as indicated): Benidorm (Pulawski, 1971), Crevillente, La Barranca, Muchamiel, Muro del Comtat, Novelda, San Vincente del Raspeig. **Almería**: Laujar (Suárez, 1959). **Burgos**: Fuentespina (Gayubo and Sanza, 1986). **Cáceres** (Gayubo, Asís, and Tormos, 1990): Jarandilla de la Vera, Santa Cruz. **Cádiz**: Jerez de la Frontera (1 ♀, 2 ♂), Jimena de la Frontera (Pulawski, 1971). **Ciudad**

Real (Gayubo, 1987): Los, Picón, Pozuelos. **Gerona**: Rosas (2 ♂). **Jaen**: La Carolina (Pulawski, 1971). **Madrid** (Gayubo and Mingo, 1988, or as indicated): Aranjuez (Giner Marí, 1943), Cercedilla, El Escorial (1 ♀, 1 ♂, TMP), Estación Biogeólogica de El Ventorrillo in Sierra de Guadarrama (Nieves-Aldrey et al., 2003; Gayubo et al., 2004), Los Molinos, Madrid (Mercet, 1909), Montarco (Giner Marí, 1943), Monte de el Pardo (Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004), Ribas de Jarama. **Málaga**: Marbella (de Beaumont, 1962), Ronda (Pulawski, 1971). **Salamanca** (Gayubo, 1984, or as indicated): Hinojosa de Duero (Gayubo, Asís, and Tormos, 1990), Las Arribes del Duero (Gayubo, González, and Torres, 2000), Saldeana, San Martín del Castañar (Cruz-Sánchez et al., 2005), Valverdón, Villaflores. **Segovia**: Coca at 41°13′N 4°31′W (1 ♀, 1 ♂, SCHL), San Rafael (Gayubo and Mingo, 1988), Segovia (1 ♂, SCHL). **Soria** (Gayubo, García, Torres, and González, 1999): Aliud, Añavieja, Carabantes, Diones, Morón de Almazán, Rabanera del Campo, Tardajos de Duero, Tejado, Torralba del Moral, Zamajón; also Chavaler (González et al., 2003). **Toledo**: Alberche (Gayubo and Mingo, 1988), Toledo (11 ♀, 26 ♂). **Valencia**: El Palmer (Puławski, 1971), El Plá (Pulawski, 1971), El Saler ((1 ♂, SCHL), Malvarrosa (Gayubo and Mingo, 1988), Valencia (Gayubo and Mingo, 1988). **Valladolid**: Viana de Cega (Gonzáles, Gayubo, and Torres, 1998, 1999). **Zamora** (Gayubo, 1986a): Fresno de la Ribera, Jambrina, Mayalde, Peñausende, Perilla de Castro, Zamora. **Location unknown**: Sierra Morena: no specific locality (Pulawski, 1971). **SRI LANKA**: **Anuradhapura District**: Hunuwilagama near Wilpattu National Park (1 ♀, 1 ♂, USNM). **Hambantota District**: Palatupana Tank (1 ♂, USNM). **Mannar District**: Kokmotte Bungalow 0.5 mi NE Wilpattu National Park (3 ♀, 1 ♂, USNM). **Trincomalee District**: Trincomalee: China Bay Ridge Bungalow (2 ♀; 4 ♀, USNM). **SWAZILAND**: Usutu Forest (1 ♀, ZMAN). **SYRIA** (Pulawski, 1971, or as indicated): Damascus area (Ibn Mefis, Mezzé, Wadi el Kern), Rankus 40 km N Damascus (1 ♂, OÖLM), Wadi Raqqad. **TAJIKISTAN**: Djilikul and Kabadian (Pulawski, 1971), Dushanbe (1 ♀), Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TANZANIA**: **Arusha Region**: Arusha National Park: Ngurdoto Crater (1 ♂), Lake Manyara National Park: Mto Wa Mbu (2 ♀), Ngorongoro Crater (3 ♀, 1 ♂), 6 km N Usa near Arusha (1 ♀, 1 ♂, USU). **Coast Region**: 17 km E Chalinze (1♀, 1 ♂), Pugu Forest near Kisarawe (1 ♀). **Iringa Region**: 92 km ENE Iringa (1 ♂). **Kilimanjaro Region**: Kisiwani 27 km SE Same (1 ♀), Mkomazi Game Reserve: Ibaya (4 ♀, 15 ♂, SAM) and Kikolo Plot (1 ♀, 1 ♂, SAM), 19 km SE Same (1 ♀, 2 ♂), 20 km SE Same (2 ♂). **Mara Region**: Serengeti National Park: Seronera (3 ♀, 2 ♂). **Morogoro Region**: Kilombero (1 ♂, ZMAN), 43 km E Morogoro (1 ♀), 128 road km NW Morogoro (2 ♀, 7 ♂), 48 km W Morogoro (3 ♀, 2 ♂; 2 ♂, UDS), 62 road km SW Morogoro (4 ♀, 8 ♂). **Shinyanga Region**: Old Shinyanga (1 ♀, BMNH). **Singida Region**: 20 mi SW Itigi (1 ♂), Singida (1 ♂). **Tanga Region**: 11 km SW Korogwe (1 ♂), 33 km SW Korogwe (1 ♂), 62 km SW Korogwe (1 ♂), 10 km WNW Mabokweni (1 ♀, 2 ♂), 2 km NE Mkomazi (3 ♂), Mombo (1 ♀), Pangani River Camp 86 km NW Korogwe (2 ♀), Usambara Mountains: Amani (1 ♂; 2 ♀, 1 ♂, ZMUC) and Monga N of Amani (1 ♀, 1 ♂; 2 ♀, ZMUC). **TOGO**: Langobou 57 km N Atakpamé (1 ♀), 5 km W Sokodé (1 ♀). **TUNISIA**: Nefta (1 ♂), 15 km W Nefta at 33°50′N 7°43′E (3 ♂, CSE), Tozeur (Pulawski, 1971). **TURKEY**: **Antalya**: Yakacikköyü at 39°58′N 35°52′E (1 ♀). **Erzurum**: University campus (Gayubo, Özbek, and Yildirim, 2003). **Hatay**: Antakya (4 ♂). **Istanbul**: Istanbul (1 ♂). **Manisa**: 10 km N Muradye (1 ♂, OÖLM). **Mersin**: Tarsus (Pulawski, 1967). **Sivas**: Serafiye area (Puławski, 1967). **Tekirdag**: 24 km on Malkara-Inecik road (Puławski, 1967). **TURKMENISTAN**: Askhabad (3 ♂), Firuza 40 km W Askhabad (Pulawski, 1971), 40 km NE Mary (1 ♂). **UGANDA**: Lake Victoria (1 ♀, CNC). **UKRAINE**: **Crimea**: Karadagh (Pulawski, 1971). **UNITED ARAB EMIRATES**: Khor Fakkan (1 ♀, 1 ♂, KMG). **Dubai**: Nakhali (2 ♂, UCD). **UZBEKISTAN** (Pulawski, 1971, or as indicated): Aksakata in Chatkal Range in Tashkent Oblast' (Islamov, 1986), Dzhuma 30 km W Samarkand, Khiva-Ravat (1 ♂), Tashkent area (Mayskoye, Vrevskaya), Yargak 30 km WNW Khatta-Kurgan (1 ♂). **YEMEN**: Al Kadan (13 ♀, 3 ♂, ZMAN), Al Kowd (3 ♀, 1 ♂, ZMAN), Lahj (4 ♀, 1 ♂, ZMAN; 13 ♀, 7 ♂, RMNH), Sanaa (1 ♀, 2 ♂, ZMAN). **ZAIRE**: **Bas-Zaïre**: Mvuazi (1 ♀ (FSAG). **District Fédéral**: Kinshasa (1 ♀, FB). **Equateur**: Boketa (2 ♀, FSAG). **Haut-Zaïre**: Basoko (1 ♀, MRAC), Kisangani: Opala (1 ♀, MRAC), Uele: Bayenga in Wamba Territory (1 ♀, MRAC), Virunga National Park: N Talia River in Tshiaberimu sector (2 ♀, MRAC). **Kivu**: Goma (1 ♀, 1 ♂, MSNT), Mount Goma (3 ♀, MSNT). **Shaba**: Lofoie (2 ♀, 4 ♂, MSNT). **Zaïre Central**: Mbanza Ngungu (3 ♂). **ZAMBIA**: **Central Province**: 2 km E Mumbwa (1 ♂, MSNT). **Eastern Province**: 32 km E Petauke (1 ♂). **Lusaka Province**: Chilanga 15 km S Lusaka (1 ♀), ca 20 km E Lusaka International Airport (1 ♀). **Northern Province**: 60 km N Kasama (1 ♀), 76 km S Kasama (1 ♂). **Southern Province**: 7 km SW Kalomo (1 ♂). **ZIMBABWE**: Bubye River 80 km NE

Beit Bridge (2 ♀, OÖLM), Bulawayo (3 ♀, AMG; 2 ♀, 2 ♂, AMNH; 1 ♂, SAM; 3 ♀, 5 ♂, TMP; 1 ♂, USNM), Bulawayo airport at 20°00′S 28°38′E (2 ♀), Bulawayo: Hillside (2 ♀), Bulawayo at Umguza River (1 ♂), Chimanimani, formerly Melsetter (2 ♂; 1 ♀, 2 ♂, JG), 50 km NW Chipinge (1 ♂, OÖLM), Chishawasha near Harare (17 ♀, 10 ♂, BMNH), Hope Fountain (2 ♀, 2 ♂, TMP), Iwaba near Kwekwe (2 ♀, BMNH), Kami Ruins (1 ♀), Lion and Cheetah Park 24 km W Harare (8 ♀, 5 ♂; 3 ♀, 3 ♂, NHMZ), Lomagundi (2 ♀, AMG), Matetsi in Hwange District (1 ♀, AMG; 1 ♀, ZMAN), Matobo (Arnold, 1923), Mavuradonha Wilderness area 15 km E Muzarabani (1 ♂, OÖLM), Mbizi Game Reserve (= Rocky Farm) 20 km SE Harare (1 ♀), Mt. Selinda 40 km S Chipinge (1 ♂, OÖLM), 11 km NE Nyamandhlovu (2 ♀), Redbank at Kami River (5 ♀, 2 ♂), Sawmills (1 ♀, SAM), Selukwe (1 ♀, AMG), Troutbeck in Inyanga Mountains (2 ♀; 2 ♀, JG), Umguza River (1 ♀, TMP), Victoria Falls (6 ♀).

Tachysphex costae (De Stefani Perez)

Figures 101–103.

Tachytes costae De Stefani Perez, 1882:42, ♀ (as *Costae*, incorrect original capitalization). Syntypes: ♀, Italy: Sicilia: Sciacca (depository unknown), not examined.— De Stefani Perez, 1895:226 (in catalog of Sicilian Hymenoptera).— As *Tachysphex costae* (often spelled *costai* between 1925 and 1976): Kohl, 1885:365 (new combination, revision); Dalla Torre, 1897:678 (in catalog of world Hymenoptera); Ferton, 1901b:680 (found in Marseille area, France, but not in Corsica); Antiga and Bofill, 1904:10 (in catalog of Catalonian Hymenoptera); de Gaulle, 1908:121 (listed from France); Mercet, 1910:165 (listed from Spain); Morice, 1911:102 (Algeria); Berland, 1925:120 (in Sphecid Fauna of France); von Schulthess, 1929:185 (Greece); Grandi, 1930:318 (nesting habits), 327 (description of mature larva), and 341 (Italy, 1931:47 (reference to previous observations); Guiglia, 1932b:475 (Libya); Nadig, 1933:78 (Morocco); Giner Marí, 1934:134 (Spain); Grandi, 1934:59 (prey, larva); Guiglia *in* Zavattari, 1934:304 (Libya); Nadig, 1934:32 (Corsica, Sardinia); Bernard, 1935:65 (France); de Beaumont, 1936a:198 (in revision of French *Tachysphex*), 1936c:8 (specimen in A. Costa collection), 1940:170 (in revision of Egyptian *Tachysphex*); Guiglia, 1940:291 (Libya), 1942b:234 (Libya); Giner Marí, 1943:140 (in Sphecid Fauna of Spain); Guiglia, 1943a:71 (Albania); Giordani Soika, 1944:9 (Sicily); Guiglia, 1944:27 (Italy); Deleurance, 1945:25 (nesting habits); Giner Marí, 1945b:360 (Morocco); de Beaumont, 1947a:175 (in revision of Egyptian *Tachysphex*), 1947b:391 (Cyprus); Guiglia, 1948:201 (Sardinia); de Andrade, 1949:15 (Portugal); Pittioni, 1950:25 (Cyprus); de Beaumont, 1954a:55 (Italy, diagnostic characters), 1954b:91 (Italy), 1955a:181 (Morocco); Ceballos, 1956:376 (listed from Spain); de Beaumont, 1956a:197 (Libya); Morel, Nouvel, and Ribaut, 1956:338 (France); de Beaumont, 1958:61 (Algeria); Nouvel and Ribaut, 1958:13 (France); Pulawski, 1958:180 (Bulgaria); de Beaumont, 1959:27 (Italy); Diniz, 1959:29 (Portugal); de Beaumont, 1960a:16 (Greece: Island of Rhodes), 1960b:238 (Libya), 1961a:49 (Greece: Crete); Grandi, 1961:194 (life history) and 506 (larva); de Beaumont, 1962:25 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Diniz, 1964:29 (Portugal); de Beaumont, 1965:48 (Greece), 1966:212 (Egypt); Balthasar, Hrubant, and Hrubant, 1967:171 (Bulgaria); Pulawski, 1967a:397 (Turkey); Königsmann, 1971:106 (Spain); Pulawski, 1971:400 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Erlandsson, 1974:71 (France, Italy, Malta, Spain); Bohart and Menke, 1976:273 (listed); Simon Thomas, 1976:5 (France); Georghiou, 1977:192 (Cyprus); Guichard, 1978:271 (Greece); Kazenas, 1978:115, 127 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:215, 220 (in key to Sphecidae of European USSR); Pagliano, 1980:128 (Italy); Steiner, 1981:329 (stinging sequence); Gayubo, 1984b:363 (Portugal), 1985a:168 (Spain), 1986a:32 (Spain); Gayubo and Tormos, 1986a:12 (Spain); Gayubo, 1987:111 (Spain); Asís and Jiménez, 1988:271 (Spain); Gayubo and Mingo, 1988:78 (Spain); Pagliano, 1990:103 (in catalog of Italian Sphecidae); Gayubo, Borsato, and Osella, 1991:401 (Italy); Gayubo and Torres, 1991:Table 1 (Spain); Schembri, 1991:180 (Malta); Gayubo, Borsato, and Osella, 1992:281 (Greece); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Pagliano and Scaramozzino, 1995:731 (Italy); Wu and Zhou, 1996:89 (China); Gayubo, García, Torres, and González, 1999:89 (Spain); Gayubo, González, and Torres, 2000:185 (Spain); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia), 156 (review of known biology); Schmidt and Bitsch *in* Bitsch et al., 2001:244 (in Sphecid Fauna of Western Europe); Kazenas, 2002:66

(Kazakhstan); Generani, Pagliano, Scaramozzino, and Strumia, 2003:65 (Italy: Arcipelago Toscano); Cruz-Sánchez et al., 2005:220 (Spain); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex laticeps Arnold, 1924:58, ♀, ♂. Lectotype: ♀, Zimbabwe: Sawmills (SAM), **here designated**, examined. **New synonym**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:274 (listed).

Tachysphex zarudnyi Gussakovskij, 1933:284, ♀. Holotype: ♀, Iran: Khorassan: Khulut-s-Langher (ZIN), examined before 1971. Synonymized with *Tachysphex costae* by Pulawski, 1971:400 and 404.

Tachysphex tadzhikus Gussakovskij, 1952:239, ♀. Holotype: ♀, Tajikistan: Stalinabad, now Dushanbe (ZIN), examined before 1971. Synonymized with *Tachysphex costae* by Pulawski, 1971:400 and 404.

Tachysphex costai canariensis de Beaumont, 1968a:261, ♀, ♂. Holotype: ♀, Canary Islands: Gran Canaria: Maspalomas (BMNH), examined before 1971. **New synonym**.— Pulawski, 1971:406 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:273 (listed); Báez and Ortega, 1978:192 (Canary Islands); Hohmann, La Roche, Ortega, and Barquín, 1993:232 (Canary Islands).

Tachysphex costai fertoni Pulawski, 1971:406, ♀, ♂. Holotype: ♀, Algeria: La Calle, now El Kala (MNHN), examined before 1971. **New synonym**.— Bohart and Menke, 1976:273 (listed).

As *Tachysphex fluctuatus* (corrected to *Tachysphex costae* by Pulawski, 1971:401, 406): Ferton, 1912:399 (life history); Grandi, 1931:47 (reference to Ferton, 1912); Cros, 1936:355 (life history); Móczár, 1938:80 (Hungary).

As *Tachysphex buyssoni*: Guiglia, 1932:475 (Libya), corrected to *Tachysphex costai* by Guiglia, 1940:291.

Le Tachyte manticide: Fabre, 1886:229, 233–249 (life history); de Gaulle, 1908:121 (listed from France); Berland, 1923a:173 (identification of Fabre's specimens).

Recognition.— *Tachysphex costae* has the apical depression of sternum I intersected by a longitudinal carina (as in Fig. 132a), the erect body setae either straight or angled apically but not sinuous (except somewhat sinuous on the propodeum posterolaterally), the mesopleural setae not concealing the integument, and male sternum III with conspicuous, suberect setae on the apical depression. In addition, hindwing vein cu-a is oblique in most specimens (anal end further away from wing base than cubital end), but it is vertical or nearly so in many southern African specimens. Several species are similar, but *costae* differs as follows:

In the female, the pygidial plate is margined throughout by a lateral carina (not margined next to the apex in *erythropus*), and the apical tarsomeres of the mid- and hindtarsi have two or three small spines on each lateral margin (spines lacking in *grandissimus* and *sordidus*). The gaster is red basally in many Mediterranean and western Asian specimens, and such individuals differ from *schoenlandi* (southern Africa) only with difficulty: their clypeal lip and labrum each has a well-defined mesal notch (labrum and clypeal lip vary from entire to emarginate in *schoenlandi*). Southern African specimens of *costae* have an all black gaster and well-defined mesopleural punctures, whereas in *schoenlandi* the gaster is red basally and mesopleural punctures are minute, ill defined.

In the male, the apical depression of sternum III (of sterna III–V or III–VI in populations north of the equator and those from southern Kenya) are covered with subappressed or suberect setae that are not agglutinated except appearing agglutinated on sternum III apicomesally (Fig. 101). The male of *erythropus* is similar, but unlike that species, the forefemoral notch of *costae* is not compressed into a crest; also, the notch has a proximal tuft of erect setae in European, North African, Kenyan, and Asian specimens (no such tuft in *erythropus*). Sub-Saharan specimens of *costae* have an all black gaster, whereas the gastral base is red in many *schoenlandi*.

Some North African *sericeus* closely resemble *costae* as most of their setae are nonsinuous. They differ from North African populations of *costae* in having an all black gaster (rather than all or partly red) and in lacking the setal tuft at the proximal end of the male forefemoral notch.

Species delineation.— European and Asian *costae* are so different from West African and

southern African specimens that two species seem involved at first (see Variation below for details). I regard them as conspecific because they intergrade in the intermediate areas. For example, the specimens from Samba Dia area, Senegal, have characteristics of both forms: the female resembles the European and Asian specimens, whereas the male is similar to other sub-Saharan individuals. A female from El Kala, Algeria, and two Ethiopian males are also intermediate.

FIGURE 101. *Tachysphex costae* (De Stefani Perez): gastral segments II–VII in lateral view (×30).

JUSTIFICATION OF NEW SYNONYMY.— Two subspecies were previously recognized in *costae* in addition to the nominotypical form. *Tachysphex costae canariensis* de Beaumont, 1968, from the Canary Islands, was characterized by an all black gaster and the unsculptured scutal interspaces, while *costae fertoni* Pulawski, 1971, was recognized for those North African specimens in which the gaster is all black. I think now that these two forms do not deserve a formal nomenclatural status, because the gaster varies from partly red to all black in many populations, and the shiny scutal integument is also found in many continental specimens, not only in populations from the Canary Islands. Should these two subspecies be preserved, other ones must be recognized to fully cover geographic variation, an action that would lead to unnecessary proliferation of names.

DESCRIPTION.— Gena unusually narrow in dorsal view. Scutal punctures averaging from about one to about two diameters apart. Mesopleuron dull, markedly microsculptured, with punctures that are ill defined in more northern populations, but well defined south of the equator. Propodeal dorsum ridged or irregularly rugose, intersecting posterior face at about right angle; side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior face, in dorsal half or third, mostly with wide impression rather than median sulcus, but median sulcus well defined in a female from Bulawayo, Zimbabwe (TMP). Hindwing jugal lobe enlarged (Fig. 102a), crossvein cu-a oblique (anal end further away from wing base than cubital end), but vertical in many southern African specimens. Hindcoxal dorsum with inner margin carinate basally. Sternum I with apical depression that is bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae appressed on scape; erect on postocellar area and along hypostomal carina (length about 0.4 × basal mandibular width); straight on forecoxa; most thoracic setae straight except angled apically, but nearly straight on scutum, and somewhat sinuous on propodeum posterolaterally; setae of propodeal dorsum oriented posterad (length about 0.4 × basal mandibular width).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female and smallest males, golden in most males. Wings hyaline or yellowish; forewing costal vein light brown, subcostal vein dark brown. Femora: see Variation below. Tibiae and tarsi red. Gaster black or red basally (see Variation below). Terga I–III or I–IV in female, I and II to I–IV in male, silvery fasciate apically.

♀.— Labrum with well-defined mesal notch. Clypeus: bevel markedly shorter than basomedian area; lip slightly arcuate, emarginate mesally, with or without lateral emarginations (see Variation below). Width of postocellar area 1.0–1.1 × length. Dorsal length of flagellomere I 1.7–2.3 × apical width. Dorsal foretibial surface with two to four spines, outer surface with several spines in Mediterranean, Asian, and West African specimens, with one or two spines in those from southern Africa. Forebasitarsus with 11–13 rake spines (spines divided into basal and apical groups, occasionally with single spine between them). Apical tarsomeres of mid- and hindtarsi with

two or three spines near midlength of each lateral margin and with a cluster of preapical spines on venter. Apical depression of tergum V impunctate, glabrous. Length 9.0–12.5 mm.

♂.— Inner mandibular margin with tooth and small cleft. Clypeus: bevel shorter than basomedian area; lip free margin arcuate or slightly sinuate, with well-defined corner; distance between corners 1.1–1.3 × distance between corner and orbit. Width of postocellar area 0.4–0.6 × length. Dorsal length of flagellomere I 0.8–1.2 × apical width. Outer margin of forebasitarsus, in most specimens, without preapical spines, but with one rake spine near midlength of basitarsus in single male from Tunisia; outer apical spine of foretarsomere II shorter than tarsomere III. Sternum II: setae mostly appressed and no longer on apical depression than on remaining surface (but suberect and longer in specimens from sub-Saharan Africa and those from Ramit and Varzob areas, Tajikistan, and some from Israel). Apical depression of sternum III with subappressed or suberect setae that appear agglutinated apicomesally, setae markedly longer than on remaining surface (Fig. 101); apical depression of sterna IV–VI with or without subappressed or suberect setae (see Variation below). Length 7.5–11.0 mm. Volsella and penis valve: Figs. 102b, c.

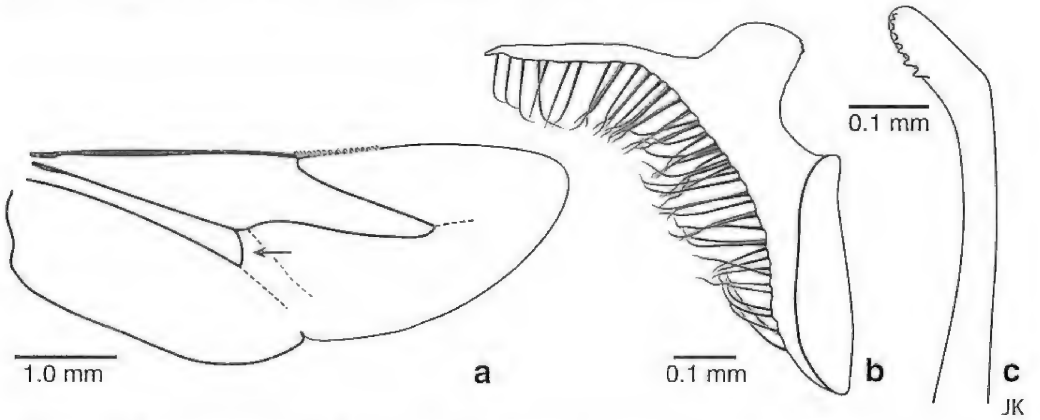

FIGURE 102. *Tachysphex costae* (De Stefani Perez): a – hindwing; b – volsella; c – penis valve.

VARIATION.— Mesopleural sculpture. The mesopleuron is dull, markedly microsculptured, with shallow, ill-defined punctures in Asian, European, North African, West African, Ethiopian, Kenyan, and Tanzanian specimens. In individuals from Zimbabwe and South Africa, the mesopleuron has well-defined punctures that are more than one diameter apart at center.

Female clypeus. The clypeal lip is not incised laterally in specimens from Europe, most from Asia, and the single female from Senegal. One lateral incision is present in the single female from Algeria, and two incisions in females from Kenya, Tanzania, Zimbabwe, South Africa, and some from Israel.

Male forefemoral notch. The forefemoral notch has a basal tuft of erect setae in Asian, European, and North African specimens. Sub-Saharan males have no such tuft except a rudimentary tuft is present in the few specimens examined from Senegal and Kenya.

Male sternal setae. Anterior portions of sterna IV–VI (cephalad of apical depressions) are largely glabrous in specimens from Pakistan and sub-Saharan Africa (sternum IV setose in one of the Ethiopian specimens), but setose in European, most Asian, North African specimens, and one from Zinguinchor, Senegal.

Male sterna: fringes on apical depressions. In most populations, a fringe (at least partly erect) is present on sterna III–V of III–VI, but only on sternum III in males from southern Africa,

Tanzania, and one from Ethiopia; the other Ethiopian specimen has a well-defined fringe on sternum III, and ill-defined fringe on sternum IV, and no fringes on the remaining sterna: sternum III has a well-defined fringe and sternum IV a rudimentary fringe in the two males from Kenya.

Setae of interocellar and postocellar areas. In specimens from Asia, Europe, North Africa, West Africa, and some from Tanzania, setae are nearly appressed on the interocellar area and about as long as one midocellar diameter on postocellar area. In specimens from Kenya, Zimbabwe, South Africa, and some from Tanzania, setae are suberect on the interocellar area, and markedly longer than midocellar diameter on the postocellar area (equal to 0.3–0.4 of basal mandibular width). Ethiopian specimens are intermediate, with setae of the interocellar area suberect, and those on the postocellar area about as long as midocellar diameter.

Scutal setae. Nearly appressed in specimens from Asia, Europe, North Africa, and West Africa, but nearly erect in specimens from Ethiopia, Kenya, Tanzania, and southern Africa.

Color of frontal setae. Setae silvery in female, in males from sub-Saharan Africa (except gold in specimens from Nigeria, Ethiopia, and Kenya), and in small males from other areas; golden in most males north of Sahara.

Color of legs. Legs all black in southern African specimens. Femora varying from mostly red to largely black in females from Asia, Europe, North Africa, and West Africa; and all black (except apically) in males from these areas (mid- and hindfemora red in both females and most males from Tanzania). Tibiae all red in Asian, European, North African, Ethiopian, Kenyan, and Tanzanian specimens as well as in females from western Africa; black dorsally and red ventrally in males from western Africa, or foretibia all red (all tibiae largely red in male from Zinguinchor, Senegal).

Color of gaster. Gaster black, but segments I and II all or partly red in some females from Balkan Peninsula and Tajikistan, in females and many males from Italy, and all red in specimens from southwestern Europe (including Sardinia and Corsica), northwest Africa, Cyprus, and Middle East.

NESTING BEHAVIOR.— Nesting habits and prey of *costae* were observed by Fabre (1886) and Deleurance (1945) in France, by Grandi (1930, 1961) in Italy, and by Ferton (1912) and Cros (1936) in Algeria (see the synonymy section above for the names used by these authors). Nests were established in sandy or sandstone cliffs and were permanently open during the provisioning period. Grandi supposed that the nests might be reused galleries of other aculeates, and Ferton and Cros found that they were indeed reused old burrows of ants and of *Philanthus triangulum* Fabricius. The number of cells per nest varied from one to eight (Grandi), and was 10 according to Deleurance. The ant nest used by *costae* consisted of a maze of galleries and chambers, but the chambers alone were used as cells.

Prey are the mantids *Ameles abjecta* Cyrillo, *Ameles decolor* Charpentier, *Empusa pauperata* Latreille, and *Mantis religiosa* Linnaeus, mostly nymphs but occasionally adult males. They are flown to the nest, held by the antennal bases with the wasp's mandibles. The female enters the nest directly, without stopping at the entrance. Even if forced by the observer to walk on the sand cliff in which she nests, she takes off before entering the gallery. Taking the paralyzed mantid away from the wasps and substituting it with a fresh one, Fabre established that three stings were necessary to paralyze it: the raptorial forelegs first, the midlegs next, then the hindlegs. Similar experiments were performed by Cros who noticed only the first sting; Deleurance and Steiner (1981) also reported the first sting being directed toward the raptorial legs. The number of prey per cell were 3–16 according to Fabre, no more than six according to Grandi, one, three, or four according to Cros, and averaging eight (10 in one case) according to Deleurance, and their length varied between 9 and 20 mm (Deleurance). They were all positioned head in, and the wasp's egg was placed on the external surface on the prey forecoxa (either right or left).

To construct a cocoon, the larva first attaches several silk threads to the cell's wall, suspending itself on a kind of a loose hammock, and spins a ring around the body's midlength (Fabre, Grandi, Deleurance). It then picks sand grains with the mandibles, humidifies them with saliva, and superimposes them on the ring. The ring gradually extends toward the body's rear end until the posterior half of the cocoon is completed. The larva then reverses its position and completes the other half.

In the old ant nests, the same chamber may be utilized more than once by the same female, with a cocoon and a larva being found there simultaneously. As Ferton pointed out, this is in apparent contradiction with other aculeates, which reuse the cell only after cleaning it carefully. In *costae*, however, the female may miss the fresh cocoon, still suspended in a hammock, while she sweeps the floor. The hammock threads gradually degrade, and the cocoon falls on the floor, so that two or more may eventually lay side by side. In one case, Ferton found 14 cocoons in a single chamber, probably the progeny of the same female. Deleurance reported two larvae in a single cell.

Grandi (1961) described the larva of this species.

The parasites of *costae* are the meloid beetle *Cerocoma schaefferi* Linnaeus, the bombyliid fly *Anthrax hesperus* Rossi, and the sarcophagid flies *Miltogramma punctatum* Meigen and *Sphecapata albifrons* Rondani.

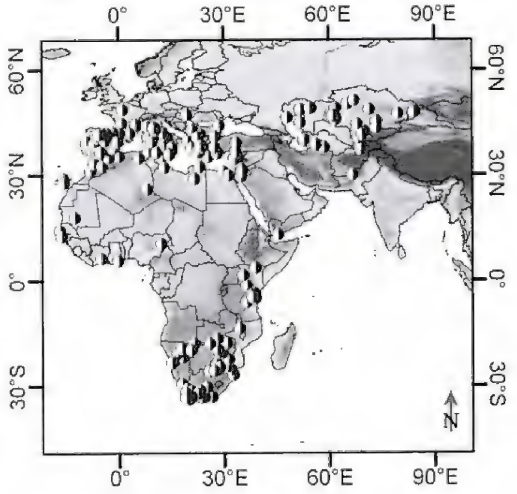

FIGURE 103. Collecting localities of *Tachysphex costae*.

GEOGRAPHIC DISTRIBUTION (Fig. 103).— Mediterranean basin, north to southern France, Romania, and Hungary; east to Kazakhstan, Transcaspian Region, and western Pakistan; recorded from China by Wu and Zhou (1996); south to South Africa.

RECORDS (localities for which the number of specimens studied or a bibliographic reference are not indicated are all from Pulawski, 1971).— **ALGERIA**: Biskra (Morice, 1911), El Kala (1 ♀, paratype of *costae fertoni*), Mascara (Cros, 1936), Tassili des Ajjer: Rank'lit (de Beaumont, 1958). **ANGOLA**: Kaifuchi, a locality not found in available gazetteers and maps (1 ♂, BMNH). **BULGARIA**: Aytos (1 ♀, 7 ♂), Nesebyr (1 ♀, 3 ♂), Sandansky (1 ♀), Slanchev Bryag (1 ♂), Sozopol (1 ♀, 1 ♂). **CANARY ISLANDS**: **Gran Canaria**: Caserones 3 km NW San Nicolás (1 ♂, ZMAN), Maspalomas (2 ♂, paratypes of *costae canariensis*), Tauro 6 km NW Arguineguin (1 ♂, ZMAN). **CYPRUS**: Ayia Napa 10 km W Capo Greco (2 ♂; 1 ♀, 2 ♂, SCHL), Cherkes (1 ♀), Famagusta (1 ♀, 1 ♂), Kolossi (1 ♀), Limassol (2 ♀, 3 ♂), Paralimini (1 ♂), Pyrgos (1 ♀), Troodos, Yermasoyia River (6 ♀, 7 ♂), Zakaki (1 ♂). **EGYPT**: **Al Iskanderiyah** (= Alexandria): Amrye (de Beaumont, 1966). **Al Qahirah** (= Cairo): Wadi Digla (1 ♂, SAM). **ETHIOPIA**: **Sidamo**: 16 km N Moyale (1 ♂), 22 km N Moyale (1 ♂). **FRANCE**: **Alpes-Maritimes**: Cros de Cagnes (Erlandsson, 1974). **Aude**: Leucate (1 ♂). **Bouche-du Rhône**: Marseille (Kohl, 1885), Rognac (Berland, 1925), Vitrolles (Berland, 1925). **Corse**: Ajaccio (Nadig, 1934), no specific locality (1 ♂). **Drôme**: Nyons (Berland, 1925). **Gironde**: Bordeaux (Kohl, 1885). **Hérault** (Bitsch et al., 2001): Minerve, Nissan-lez-Ensérune. **Lot-et-Garonne**: Forêt de Campet (Simon Thomas, 1976). **Pyrénées-Orientales**: Banyuls-sur-Mer (2 ♂), Claira and Pollestres (Morel, Nouvel, and Ribaut, 1956), Puig-del-Mas near Baillaurie (Nouvel and Ribaut, 1958). **Var**: Esterel, Maures (Bernard, 1935), St.-Aygulf. **Vaucluse**: Carpentras (2 ♂), Sérignan (Fabre, 1886). **GHANA**: Legon 12 km NNE Accra (1 ♂). **GREECE**: **Aegean Islands**: Astypalaia (as Stampalia: von Schulthess, 1929; de Beaumont, 1954a), Euboea: Nea Artaki (Gayubo, Borsato, and Osella, 1992); Mykonos: Megale Ammos (2 ♂); Rhodes: Apolakkia (1 ♀, 1 ♂, SCHL), Fanes, Ixia (1 ♀, 1 ♂), Malonas (2 ♀, MSNT), Kremasti and Petaloudes (de Beaumont, 1960a). **Ionian Islands**: Corfu: no specific locality (1 ♀, 7 ♂), Zakinthos (1 ♂, SCHL). **Kriti**

(= Crete): Ayia Varvara (1 ♂), Knossos (1 ♀, 1 ♂), Lasithou Mts.: Tzermiadhon at 35°12′N 25°30′E (1 ♂, MSNT). **Macedonia**: ancient city of Pella (1 ♀). **Pelopónnisos**: 5 km S Monemvasia (1 ♂), Pyrgos (1 ♀), Tolon (5 ♀). **Sterea Ellás** (= Central Greece) (de Beaumont, 1965): Athens, Nea Kifissia, Thebes. **HUNGARY**: Pótharaszt-puszta (Móczár, 1938). **IRAN**: **Fars**: Daria Namak 27 km E Shiraz (2 ♂). **Khorasan**: Khulut-s-Langher (Gussakovskij, 1933). **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973): Beeri, Jerusalem, Kfar Yeroham 30 km SSE Beersheba (1 ♀). Also: 5 km W Elat (1 ♂, CSE), En Zeelim on Dead Sea 5 km N Masada (1 ♂, CSE), Mezad Aqrabbim 45 km SE Beersheba (5 ♀, 8 ♂, CSE). **ITALY**: **Campania**: Porto d'Ischia (Erlandsson, 1974). **Lazio**: Acilia (de Beaumont, 1954b), Circeo (1 ♀), Roma: Ponte Mammolo and Prima Porta di Roma (de Beaumont, 1959), Settecamini (de Beaumont, 1959). **Liguria**: Imperia (Guglia, 1944). **Sardegna**: Alghero (1 ♂), Cagliari (1 ♂), Cala Liberotto, Capo Falcone (Erlandsson, 1974), Iglesias (Nadig, 1934), Lago di Cogghinas, San Giorgio Molafà, Sorso, Tissi, Villasalto (Guiglia, 1948). **Sicilia**: Castelammare, Gela, Isola di Lampedusa (Pagliano, 1990; Pagliano and Scaramozzino, 1995), Sciacca (De Stefani Perez, 1882), Scicli (Pagliano, 1990), Siracusa, Taormina (Giordani Soika, 1944). **Toscana**: Campiglia Marittima (1 ♀), Isola d'Elba (de Beaumont, 1954b), Isola di Gorgona (Generani, Pagliano, Scaramozzino, and Strumia, 2003), Quercianella (Grandi, 1959), San Vincenzo (2 ♂). **IVORY COAST**: 40 km S Toumodi (2 ♀, 8 ♂; 1 ♂, MSNT). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: 60–80 km NE Yrghyz (K), Saralzhin (K), Uil (K, P). **Astana**: Kökshetaū at Terisakkan River W Astana (P), 6 km SE and 12 km S Priozernyi (K). **Atyraū**: Inderborskiy (K), Kharkin 180 km N Atyraū (P). **East Kazakhstan**: 40 km W Chernayevka = 60 km NW Zaysan at about 48°N 84.5°E (K), 20–25 km NW Tansyk (K). **Mangghystaū**: Imagombet 85 km NE Tauchik at about 44°N 52°E (1 ♀). **North Kazakhstan**: Lake Inder (P). **Qaraghandy**: Atasuskiy = Zhana Arka (P). **Qostanai**: 25 km NE Amangeldy (1 ♀), Zhalanash (K). **Qyzylorda**: 5–8 km S (K) and 5 km E (1 ♂) Akespe = 80 km W Aral'sk at about 47°N 60.5°E, 3 km NW, 30 km SE and 15 km N Aral'sk (K), 3 km NW and 7 km N Kamyshlybash (K), 28 km SW Kazalinsk (1 ♂), 14 km SE Saksaul'skiy (K). **South Kazakhstan**: 5–8 km SW and 8–10 km SE Chardara (K), Kuyuk Pass 100 km ENE Chardara at about 42°N 70°E (K), 45 km NW Suzak (K), 10 km S Syutkent on Syr-Darya River = 140 km WSW Chimkent at about 42°N 68°E (K), Turkestan (P). **Zhambyl**: 30 km SW Chu (K), 5–10 km S Mynaral W Lake Balqash (K). **KENYA**: **Coast Province**: Taita Discovery Centre (1 ♂), 14 km SW Voi (1 ♀). **Rift Valley Province**: Marich Pass Field Studies Centre (1 ♂), Magadi road 46 air km SW Nairobi (1 ♂). **LIBYA**: El-Hag (Guiglia, 1940), Garian (de Beaumont, 1956a), Jalu and 20 km S Jalu in Cufra oasis (Guiglia, 1932, as Gialo), Tmini (de Beaumont, 1960b). **MALAWI**: Chunzi near Domira Bay (1 ♀, BMNH). **MALTA** (Schembri, 1991): Fiddien, Ghadira, Gozo (Ramla), St. Thomas Bay. Also: St. Julians: Dragonara (Erlandsson, 1974). **MAURITANIA**: 25 km W Moudjéria (1 ♂, MSNT). **MOROCCO** (de Beaumont, 1955): Ijoukak, Marrakech, Midelt. Also: Goundafa (Nadig, 1933), Ifrane (1 ♂, CSE), Melilla, and Muley Rechid (Giner Marí, 1945). **NAMIBIA**: **Gobabis District**: Farm Boomlager 328 at Kainamatoje River at 22°00′02″S 18°09′14″E (1 ♂, CSE). **Otjiwarongo District**: 40 km S Otjiwarongo (1 ♂, OHL). **Rundu District**: Andara (1 ♂, NMN). **Swakopmund District**: Ganab (5 ♀, 1 ♂, PPRI), Gobabeb at Kuiseb River (1 ♀). **Tsumeb District**: 25 km SE Tsumeb (1 ♂, JG). **Tsumkwe District**: Gutscha Pan (1 ♀, NMN). **NIGERIA**: Azare (1 ♂, BMNH). **PAKISTAN**: **Baluchistan**: Hazarganji Chiltan National Park 20 km SW Quetta (1 ♂). **PORTUGAL** (de Andrade, 1949; Diniz, 1964): Cruz Quebrada, Monchique, Rezende, Sines, Trafaria, Vale de Gaio near Setubal. **Faro** (Gayubo, 1984b): Bensafrim, Sto. Estevão, Vaqueiro. **ROMANIA**: Agigea near Constanta. **RUSSIA**: Astrakhan. **SENEGAL**: 3 km NW Samba Dia = 70 air W km Kaolack (1 ♀, 1 ♂), Zinguinchor (1 ♂, ZMAN). **SOUTH AFRICA**: **Eastern Cape Province**: Grahamstown (1 ♂, AEI), 18 km WNW Grahamstown: Hilton Farm (1 ♀, 1 ♂, AMG), 6 km N Steytlerville (2 ♂, USU), Willowmore (1 ♀, 5 ♂, TMP), 9 km E Willowmore (1 ♀, 1 ♂), 37 km NW Willowmore in Grootrivierberg Range (1 ♂, USU), 6 km S Willowmore at 33°20′S 23°27′E (1 ♂). **Free State**: 30 km N Colesberg at Orange River (1 ♂, OÖLM). **Gauteng**: Tswaing (1 ♂, PPRI). **Kwazulu-Natal**: Tembe Elephant Park (2 ♂, OÖLM). **Mpumalanga**: Crocodile Bridge in Kruger National Park (1 ♂, PPRI), Middelburg (1 ♂, AMG). **Northern Cape Province**: Gideonsfontein W Fraserburg at 31°47′S 20°57′E (2 ♂, PPRI). Goegap Nature Reserve 10 mi E Springbok (2 ♂, BMNH), SW Loeriesfontein (1 ♀, 1 ♂, OÖLM), Perdefontein in Williston District (1 ♂, FSCA), Roggekloof S Sutherland (1 ♂, OHL), Victoria West (1 ♀, AMG). **Northern Province**: Afguns (1 ♀, AMG), Ellisras (2 ♀; 1 ♂, AMG), Guernsey Farm 15 km NW Klaserie (1 ♀, PMA), Mogol Nature Reserve (1 ♂, PPRI), Nylsvley Nature Reserve (1 ♀, PPRI), Pafuri in Kruger National Park (1 ♀, PPRI). **North-West Province**: Mafeking (1 ♂, ZMAN),

Rustenburg (1 ♂, USNM). **Western Cape Province**: Ashton (1 ♀, OÖLM), Beaufort West (3 ♂, SAM), 40 km E Clanwilliam: Sevilla (2 ♀, 2 ♂, USU), Greyton (1 ♂, OÖLM), Matjiesfontein (4 ♂, BMNH), Wellington: Rooshoek (2 ♀, RMNH). **SPAIN**: **Ávila**: Ávila (Gayubo and Mingo, 1988), La Alizeda, Navalperal (Gayubo and Mingo, 1988). **Badajoz**: Badajoz. **Barcelona**: Canet de Mar, Gava (Antiga and Bofill, 1904), Monistrol (Antiga and Bofill, 1904). **Cadíz**: Chiclana (Kohl, 1885), Guadiaro (Erlandsson, 1974), San Diego (Erlandsson, 1974). **Castellon de la Plana**: Benasal (Gayubo and Tormos, 1986), Onda (Asís and Jiménez, 1988). **Ciudad Real**: Valenzuela de Calatrava (Gayubo, 1987). **Gerona**: Palamós (Königsmann, 1971). **Granada**: La Zubia (de Beaumont, 1962). **Huesca**: Barbastro (2 ♀, 1 ♂), Monzon (1 ♂). **Jaen**: Las Correderas. **Madrid**: El Escorial (Gayubo and Mingo, 1988), El Molar (Gayubo and Mingo, 1988), Madrid (2 ♀, 5 ♂), Ribas de Jarama (Gayubo and Mingo, 1988), Sierra de Guadarrama (Gayubo and Mingo, 1988). **Málaga**: Ronda. **Murcia**: Lorca (1 ♀), Murcia (Gayubo and Mingo, 1988). **Navarra**: Tudela. **Salamanca**: Las Arribes del Duero (Gayubo, González, and Torres, 2000), Salamanca (Gayubo and Torres, 1991), San Martín del Castañar (Cruz-Sánchez et al., 2005). **Segovia**: Coca (1 ♂, SCHL). **Soria**: Aldea de San Esteban (Gayubo, García, Torres, and González, 1999). **Toledo**: Toledo. **Valencia**: Navalon de Arriba, also Picasent and Torrente (Giner Marí, 1934). **Valladolid**: Valladolid (Gayubo, 1985a). **Zamora** (Gayubo, 1986a): Fermoselle, Fresno de la Ribera. **TAJIKISTAN**: Adjigarm, Dushanbe (Gussakovskij, 1952), 21 km on Dushanbe-Varzob road (1 ♂), Kirovabad, Kondara 35 km N Dushanbe (2 ♀), Puguz, Ramit (1 ♂). **TANZANIA**: **Dodoma Region**: 74 km E Dodoma (1 ♂). **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya (1 ♂, SAM), 18 km S Same (1 ♂). **Tanga Region**: 73 km NW Korogwe (1 ♀, 1 ♂), 10 km WNW Mabokweni (1 ♂), 2 km NE Mkomazi (1 ♂). **TUNISIA**: 3 km E Nabeul (1 ♂, OHL). **TURKEY**: **Ankara**: 20 km N Sereflikoçhisar (1 ♂). **Izmir**: Ephesus. **Mersin**: Mut. **Tekirdag**: Tekirdag. **TURKMENISTAN**: Anau 10 km W Askhabad, Kara-Kala, Khodja 12 km from Ghyaurs, Krasnovodsk, Mt. Syunt in western Kopet-Dagh. **UZBEKISTAN**: Fergana, Troitskoye near Tashkent. **YEMEN**: Al Kowd (3 ♀, ZMAN). **ZIMBABWE**: Bulawayo (2 ♂, AMG; 10 ♂, SAM, including paralectotype and paratype of *laticeps*; 2 ♀, 1 ♂, TMP), Bulawayo airport (3 ♀, 1 ♂; 1 ♀, NHMZ), Bulawayo: Hillside (1 ♂; 1 ♂, NHMZ; 1 ♂, SAM, paratype of *laticeps*), Filabusi: Druid Mine (1 ♀, SAM), 30 km W Harare (1 ♂, OÖLM), Kami Ruins (2 ♀, 2 ♂; 1 ♀, 1 ♂, NHMZ), 80 mi W Kariba Gorge (1 ♂, BMNH), Matobo (1 ♂, SAM), 11 km NE Nyamandhlovu (1 ♀), Sawmills (1 ♀, AMNH; 4 ♀, 2 ♂, SAM, including lectotype ♀ of *laticeps*), Sly's Farm (1 ♂, SAM), Victoria Falls (3 ♀, 2 ♂; 1 ♀, SAM).

Tachysphex coxalis Pulawski, sp. nov.

Figures 104, 105.

DERIVATION OF NAME.— *Coxalis*, with reference to a tooth-like hindcoxal expansion, one of this species distinctive features.

RECOGNITION.— *Tachysphex coxalis* has a punctatorugose mesopleuron and the dorsal carina of the hindcoxa is produced basally into an obtuse tooth. Some *mediterraneus* are similar, but unlike that species the setae of *coxalis* are straight (rather than sinuous) and the scutal setae are about equal to midocellar diameter (rather than markedly longer). Additional recognition characters include: free margin of the clypeal lip with two lateral incisions on each side in the female (Fig. 104a), prominently arcuate and without lateral corner in the male (Fig. 104b), and the dorsal length of male flagellomere I about equal to its apical width.

DESCRIPTION.— Scutal punctures well defined, less than one diameter apart in specimen from Niger, but many discal punctures in female and some punctures in male from Mali several diameters apart. Mesopleuron punctatorugose. Propodeal dorsum irregularly rugose, with tendency to form longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin carinate, carina expanded basally into obtuse tooth.

Setae erect on postocellar area, suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter on both; suberect on scutum, and midfemoral venter; inclined posterad on propodeal dorsum.

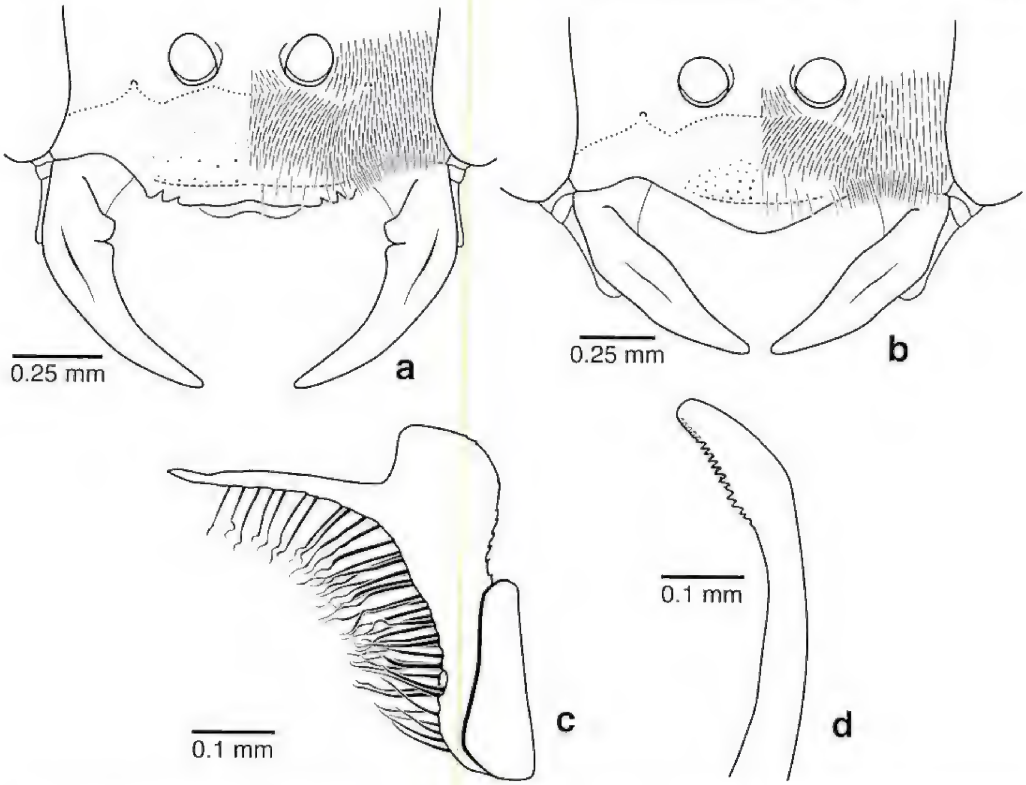

FIGURE 104. *Tachysphex coxalis* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Head, thorax, legs, and gaster black except mandible dark reddish mesally and tarsal apex brown. Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal vein of forewing yellowish brown, subcostal vein dark brown. Terga I–III silvery fasciate apically.

♀.— Labrum with free margin shallowly, broadly emarginate. Clypeus (Fig. 104a): bevel shorter than basomedian area; lip free margin shallowly, widely emarginate, with two lateral incisions of each side. Width of postocellar area 1.2 × length. Dorsal length of flagellomere I 1.4 × apical width. Forefemoral venter minutely punctate, punctures many diameters apart near base, becoming gradually denser toward apex. Dorsal foretibial surface with a few fine bristles; outer surface with two thin bristles. Forebasitarsus with nine rake spines, outer margin slightly expanded subbasally (thus slightly

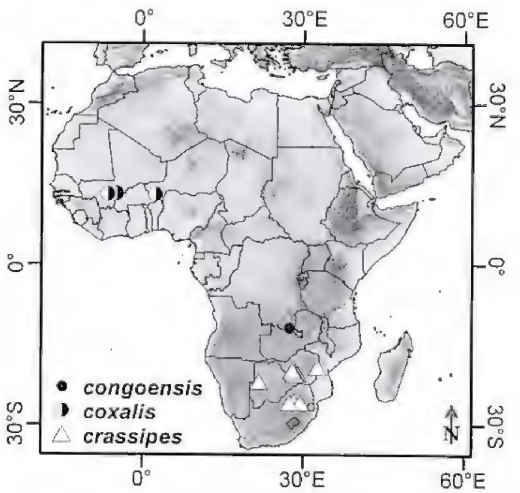

FIGURE 105. Collecting localities of *Tachysphex congoensis*, *coxalis*, and *crassipes*.

concave between expansion and apex), as in *saturnus*. Midtrochanteral venter with minute punctures that are more than one diameter apart. Apical tarsomeres with minimally convex apicoventral margin; each lateral margin of apical midtarsomere with two minute spines, outer margin of apical hindtarsomere with one such spine. Apical depression of tergum V impunctate, glabrous. Pygidial plate with well-defined punctures (except mesally) that average several diameters apart. Length 6.8 mm.

♂.— Mandible: trimmal carina without tooth and cleft. Clypeus (Fig. 104b): bevel rudimentary or absent; lip free margin prominently arcuate, without corner, forming single curved line with rest of clypeal margin; distance between lip lateral margins about equal to distance between margin and orbit. Width of postocellar area 1.2–1.7 × length. Dorsal length of flagellomere I about 1.0 × apical width. Forefemoral notch finely setose; outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length 4.6–6.4 mm. Volsella and penis valve: Figs. 104c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 105).— Mali, Niger.

RECORDS.— HOLOTYPE: ♀, **MALI**: 40 km SW Segou, 31 July 1991, MS (CAS). PARATYPES: **MALI**: 5 km S San, 3 Aug 1991, MS (1 ♂). **NIGER**: Say, 10 Oct 1976, K.M. Guichard (1 ♂, KMG).

Tachysphex crassipes Arnold

Figures 105, 106.

Tachysphex crassipes Arnold, 1923:157, ♀, ♂. Lectotype: ♀, Zimbabwe: Matobo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:273 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex crassipes var. *claripennis* Arnold, 1924:53, ♀. Holotype: ♀, Zimbabwe: Essexvale (SAM), examined. **New synonym.**— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex crassipes claripennis*: Bohart and Menke, 1976:273 (listed).

LECTOTYPE SELECTION.— Arnold (1923) mentioned a single type (without reference to sex) in his original description, but he designated a female and a male as types. I have selected the female as the lectotype.

RECOGNITION.— *Tachysphex crassipes* has a flat labrum, galea shorter than wide in lateral view, crossvein cu-a of the hindwing vertical, and unmodified tarsi (length of tarsomeres II more than twice apical width, length of tarsomeres IV more than apical width, tarsomeres V without spines on venters or lateral margins). In addition, the femora, tibiae, and gaster are all black (terga not fasciate or at most rudimentary, broadly interrupted silvery fasciae are present on terga I–III), setae are inclined posterad on the propodeal dorsum, male foretarsus has a conspicuous rake, and male sterna II–VI each has an impunctate apical depression. Also, unlike *mesembrius*, the clypeal lip is not receded laterally in the female (Fig. 106a) and not pointed in the male (Fig. 106b). This combination is shared with *punctatiformis* and *vanrhynsi*. Unlike *vanrhynsi*, the mesopleural punctures of *crassipes* are well defined (rather than minute, inconspicuous, or absent), the setae are sinuous on the thorax, at least on the scutum anteriorly (rather than straight or slightly angled apically), and the female clypeus basically has only one lateral incision on each side (rather than two). *Tachysphex crassipes* and *punctatiformis* differ by the proportions of their postocellar area, which is slightly narrower in *crassipes* (width 0.8–0.9 × length in the female and 0.8–1.0 in the male rather than 1.1–1.6 in the female of *punctatiformis* and 1.1–1.3 in the male); in addition, *crassipes* has well-defined mesopleural punctures (that are 1–2 diameters apart) and the setae appressed on the scape, tergum I, and hindfemoral venter. In *punctatiformis*, the mesopleural punctures are minute or evanescent in the male and many females (but conspicuous in some females), and the setae are

erect or nearly so on the scapal lateroventral margin in many specimens, and in many females also on the hindfemoral venter and tergum I. The three species differ in their geographic ranges: *crassipes* is found in Botswana, Zimbabwe, and northeastern South Africa, whereas *punctatiformis* ranges from Namibia to western and central South Africa, and *vanrhynsi* occurs in western South Africa.

The female of *crassipes* closely resemble *ebeninus*, and they differ mainly in the sculpture of the propodeal dorsum (irregularly ridged to rugose in *crassipes*, regularly ridged longitudinally in *ebeninus*). It is probable, however, that in some *ebeninus* the propodeal dorsum is also irregularly sculptured (see that species for details). In addition, the mesopleuron of *crassipes*, between the punctures, varies from unsculptured to microsculptured, whereas in *ebeninus* the interspaces are all unsculptured. Another similar species is *glaber* from the Abd el Kuri Island, but in *crassipes* the free margin of the clypeal lobe is sinuous or incised laterally (not so in *glaber*).

Relationship to *punctatiformis*.— *Tachysphex crassipes* and *punctatiformis* may be geographic forms of one species, as they are similar morphologically and inhabit mutually exclusive but almost adjacent areas (the gap between their ranges probably results from inadequate collecting). At this time, I treat them as discrete species because I have not observed intergradation.

Justification of new synonymy.— The two syntypes of the nominotypical form are old specimens, with wing margins worn off and the wing membrane dark. The two syntypes of the var. *claripennis*, on the contrary, are fresh, with the wing margin entire and the wing membrane hyaline. As the difference obviously results from the specimens' age, the var. *claripennis* does not warrant a taxonomic status or a formal name.

Description.— Scutal punctures well defined, averaging 2–3 diameters apart on disk in most specimens, about one diameter in some. Mesopleural punctures well defined, varying from about one to about two diameters apart; interspaces microsculptured to largely unsculptured. Episternal sulcus mostly complete but incomplete in many males. Propodeal dorsum varying from rugose to irregularly ridged longitudinally, evenly microsculptured in some specimens; side ridged. Hindcoxal dorsum with inner margin carinate.

Setae in most specimens sinuous on postocellar area, on each side of oral fossa next to occipital carina, and on thorax; inclined posterad on propodeal dorsum; on postocellar area erect, equal to 0.5–0.8 × basal mandibular width; and erect, sinuous on midfemoral venter (longest setae equal to midocellar diameter). In some males, however, setae are equal to 0.2 of basal mandibular width on postocellar area; nearly straight adjacent to hypostomal area and on propodeal dorsum; and straight, about one midocellar diameter long, on midfemoral venter.

Head, thorax, legs, and gaster black, mandible mesally and tarsal apex reddish (tarsi red except basally in some males). Frontal setae silvery in both sexes. Wing membrane nearly hyaline to slightly infumate; forewing costal and subcostal veins dark brown. Terga mostly not fasciate but one female from Kami, Zimbabwe, has rudimentary, broadly interrupted, silvery, apical fasciae on terga I–III.

♀.— Clypeus (Fig. 106a): bevel longer than basomedian area; lip free margin arcuate, with rudimentary median emargination in some specimens, incised or sinuous laterally (in some specimens also with rudimentary adlateral incision). Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width. Forecoxa with small apicomedian process. Midtrochanteral venter variously sculptured: densely punctate (punctures about one diameter apart) or with only a few, scattered punctures. Dorsal foretibial surface with three spines; outer surface with three spines, micropunctures several to many diameters apart. Forebasitarsus with 7–9 rake spines. Apical depression of tergum V impunctate, glabrous. Length 9.5–11.5 mm.

♂.— Mandibular inner margin with tooth, without cleft. Clypeus (Fig. 106b): bevel shorter to

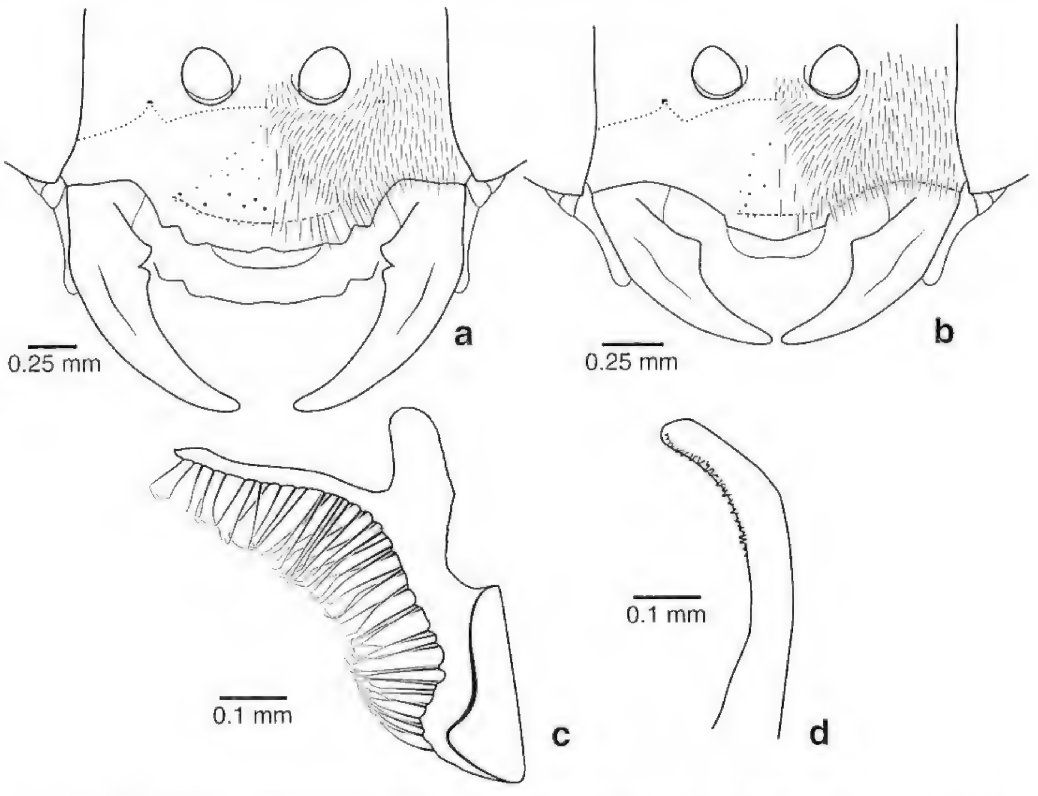

FIGURE 106. *Tachysphex crassipes* Arnold: a – clypeus and mandible of female from Kami Ruins, Zimbabwe, with outline of free margin of a specimen from former Transvaal; b – male clypeus and mandible; c – volsella; d – penis valve.

longer than basomedian area; lip free margin arcuate, with well-defined corner; distance between corners 0.7–0.8 × distance between corner and orbit. Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral notch microscopically setose to glabrous; outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Punctures of sterna II–VI (except laterally) 2–3 to many diameters apart, apical depressions impunctate, sterna III (except basally) and IV–VI with only a few, sparse punctures in one specimen from Umguza River, Zimbabwe. Length 7.3–10.6 mm. Volsella and penis valve: Figs. 106c, d.

COLLECTING PERIOD.— 13 May through August.

GEOGRAPHIC DISTRIBUTION (Fig. 105).— Botswana, Zimbabwe, northeastern South Africa.

RECORDS.— **BOTSWANA**: **Ghanzi**: Mongalatsela (1 ♂, BMNH). **SOUTH AFRICA**: **Gauteng**: Roodeplaat Horticultural Research Station at 25°37′S 28°20′E (1 ♀, PPRI). **Mpumalanga**: Middelburg (1 ♂, AMG). **Northern Province**: Buffelspoort Dam (1 ♀, AMG). **Location unknown**: Blackhill in former Transvaal (2 ♀, SAM) [one of several places of this name, can be in Gauteng, Mpumalanga, or Northern Province]. **ZIMBABWE**: Bembezi Lodge (1 ♂), Bulawayo (1 ♂; 1 ♀, 1 ♂, AMG; 1 ♀, AMNH; 2 ♀, 5 ♂, SAM; 2 ♀, 4 ♂, TMP), Bulawayo: Forestvale (1 ♂, ANSP), Bulawayo: Umguza River (5 ♂; 1 ♂, PPRI), Essexvale (1 ♀, SAM, holotype of *claripennis*), Hope Fountain (1 ♀; 1 ♂, SAM), Kami Ruins (1 ♀, 1 ♂; 1 ♂, NHMZ; 5 ♀, 5 ♂, SAM; 1 ♀, 1 ♂, TMP; 1 ♀, ZMAN), Mashonaland: no specific locality (1 ♂, SAM), Matobo (1 ♀, 1 ♂, SAM, lectotype and paralectotype of *crassipes*), Redbank (1 ♀, SAM), Sawmills (2 ♂, SAM), Umtali (1 ♂, AMG).

Tachysphex crocodilus Pulawski

Figures 107, 108.

Tachysphex crocodilus Pulawski, 1971:373, ♀, ♂. Holotype: ♀, Egypt: Kom Osheim on Cairo-Fayum road (USNM), examined.— Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex crocodilus*, known from Lower Egypt and Turkmenistan, is unique in having suberect, sinuous setae on the maxillary stipes (setal length about 1.5–2.0 × midocellar diameter). Subsidiary recognition features include: galea membranous; setae erect and sinuous adjacent to entire occipital carina, about 0.7 × basal mandibular width next to oral fossa; scutal setae suberect anteriorly; marginal cell short (Fig. 107c), maximum length (inner dimensions) about 2.8–3.1 × maximum width. The female, in addition, has the pygidial plate unusually broad, unsculptured except for a few, sparse punctures in the basal half or so and contrastingly microsculptured in the apical half or so (Fig. 107d), and the inner hindtibial spur with sparsely spaced rays near midlength (as in Fig. 233d). In the male, punctures of sterna II–VI are several to many diameters apart mesally and contrastingly denser laterally.

Description.— Mandible: outer ridge somewhat swollen and expanded over notch. Galea membranous. Scutal punctures well defined, less than one diameter apart, interspaces dull in Egyptian specimens, shiny in that from Turkmenistan. Axilla somewhat swollen between dorsal

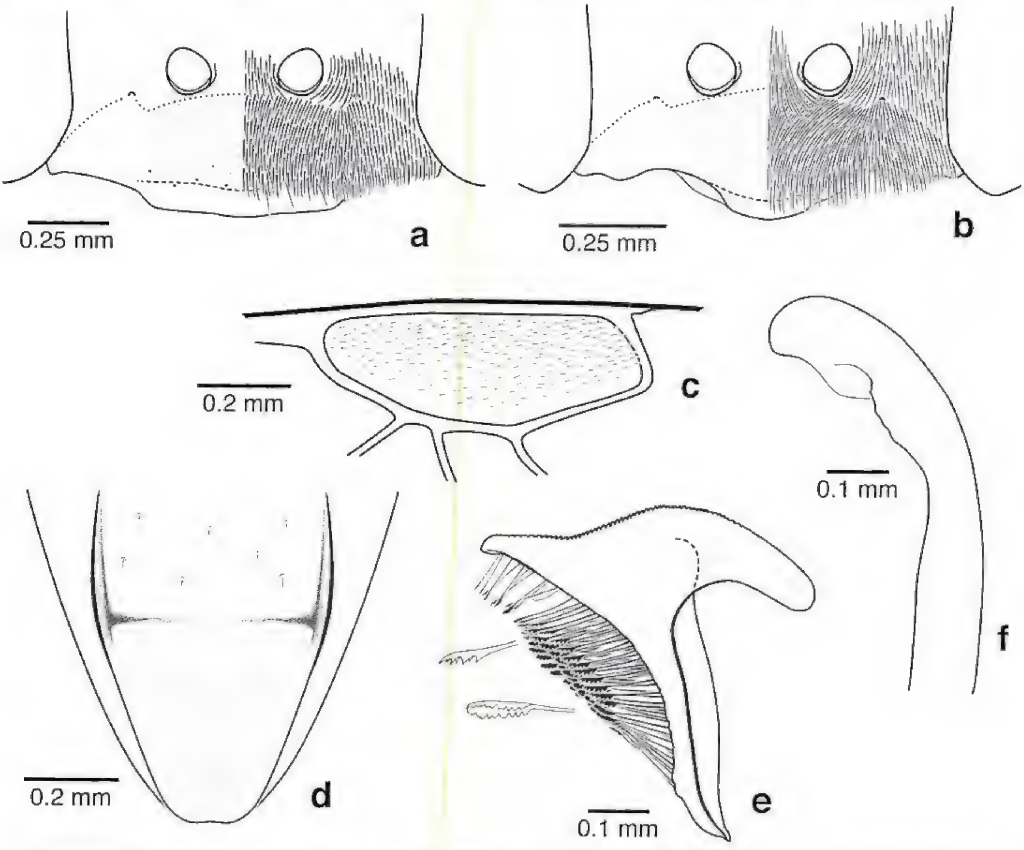

Figure 107. *Tachysphex crocodilus* Pulawski: a – female clypeus; b – male clypeus; c – marginal cell of forewing; d – pygidial plate of female; e – volsella; f – penis valve.

surface and lateral declivity. Mesopleuron finely rugose. Propodeal dorsum microareolate; side finely rugose, ridged posteriorly in Egyptian female; posterior surface, in dorsal third or so, with wide median impression. Marginal cell short (Fig. 107c), its maximum length (membrane only) about 2.8–3.1 × maximum width. Hindcoxal dorsum with inner margin not carinate. Inner hindtibial spur, near midlength, with rays sparsely spaced in female (as in Fig. 233d), slightly so in male.

Setae: appressed on postocellar area, erect and sinuous adjacent to entire occipital carina and on stipes, appressed on scutum except suberect anteriorly, concealing integument on mesopleuron, mesothoracic venter, forecoxal venter, largely so on outer hindfemoral surface, erect and sinuous on propodeal dorsum; longest genal setae (next to oral fossa) about 0.7 × basal mandibular width; propodeal side all setose; propleuron largely glabrous; sternum I glabrous laterally.

Head and thorax black, mandible yellowish red mesally. Frontal setae silvery in both sexes. Wing membrane hyaline; costal vein of forewing yellowish brown, subcostal vein brown. Femora black except apically, tibiae and tarsi red except male hindtibia somewhat darkened dorsally. Gaster: female tergum I red, tergum II red, partly black mesally, terga III and IV largely black, tergum V black (apical depressions translucent), tergum VI dark; male terga red, partly darkened, terga IV and V nearly all black. Terga I–IV silvery fasciate apically, male tergum V with ill-defined fascia.

♀.— Clypeus (Fig. 107a): bevel rudimentary; lip free margin arcuate, neither emarginate mesally nor incised laterally. Width of postocellar area 0.5–0.6 × length. Dorsal length of flagellomere I 2.3–2.4 × apical width. Forecoxa with short apicomedian process. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with eight rake spines. Inner apical spines of hindtarsomere IV almost reaching claw bases. Tergum V sparsely punctate, apical depression impunctate, glabrous. Preapical bristles of sterna IV and V thickened. Pygidial plate broadly rounded apically, with transverse ridge on its internal surface (ridge indicated externally by minimal difference in surface level in female from Egypt, by transverse groove in that from Turkmenistan); with a few, sparse punctures anterad of ridge, microsculptured posterad of ridge (Fig. 107d). Length 8.0–8.2 mm.

♂.— Mandible: trimmal carina invisible in single specimen examined. Clypeus (Fig. 107b): bevel absent; lip free margin obtusely pointed, with corner; with oblique carina emerging from corner; distance between corners 0.25 × distance between corner and orbit. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 2.1 × apical width. Forefemoral notch microscopically setose, margined both anteriorly and posteriorly. Outer margin of forebasitarsus with five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Most punctures of tergum VII several diameters apart, those next to posterior and lateral margins less than one diameter apart. Sterna II–VI with punctures that are several to many diameters apart mesally and contrastingly denser laterally; apical depression of sterna IV–VI impunctate, glabrous. Length 6.4 mm. Volsella and penis valve: Figs. 107e, f.

COLLECTING DATES.— 20 May 1965 (Egypt), 21 June 1976 (Turkmenistan).

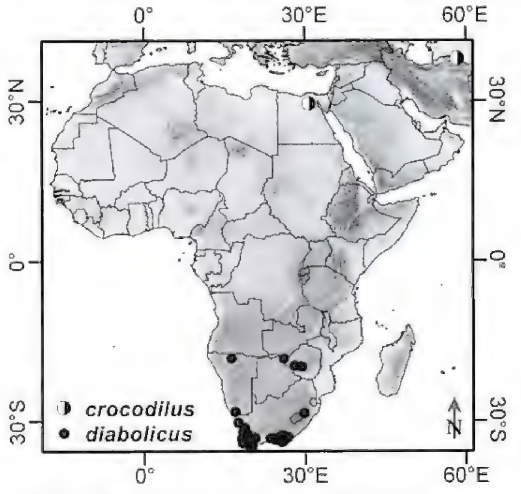

FIGURE 108. Collecting localities of *Tachysphex crocodilus* and *diabolicus*.

GEOGRAPHIC DISTRIBUTION (Fig. 108).— Lower Egypt, Turkmenistan.

RECORDS.— **EGYPT**: **Al Fayyum**: Kom Osheim (1 ♀, 1 ♂, USNM, holotype and paratype of *crocodilus*). **TURKMENISTAN**: 20 km E Askhabad (1 ♀).

***Tachysphex curvipes* Pulawski, sp. nov.**
Figures 109, 110.

DERIVATION OF NAME.— *Curvipes*, Latin noun meaning *with crooked legs*; with reference to the shape of the male forefemora.

RECOGNITION.— *Tachysphex curvipes* is one of the species in which the galea is membranous (not sclerotized), the maxillary stipes has short, inconspicuous setae, the frons is not bulging near midlength, the hindwing vein cu-a is vertical, and the length of marginal cell is more than 3.0 × width. Also, the mesopleural setae completely conceal the integument, and the gaster and the femora are all or largely red. In the female, the pygidial plate is unusually broad, broadly rounded apically (Fig. 109c), and the setae bordering the apical depressions of segments IV and V are conspicuously thickened. In the male, sterna III–VI are sparsely punctate, practically glabrous. The species ranges from the Sinai Peninsula and Israel to Turkmenistan.

The female resembles *incanus* in having the clypeal bevel shorter than the basomedian area and the free margin of the clypeal lip obtusely protruding mesally. As in *incanus*, the setae of the hindfemoral outer surface are reflective, concealing the integument along the ventral margin. Unlike that species, the tooth of the trimmal carina is low, obtuse in *curvipes* (Fig. 109a) and the pygidial plate is uniformly unsculptured and lacks a transverse groove. *Tachysphex argentatus* is similar, but the clypeal lip is not protruding mesally, the trimmal carina has a well-defined tooth, and the pygidial plate has a transverse groove and/or is microsculptured posteriorly.

The male is unique in having the forefemur characteristically curved in dorsal view (Fig. 109d). In addition, the clypeal free margin is conspicuously, narrowly projecting mesally (Fig. 109b). The forefemoral notch is deep (about 0.3 × femoral diameter in posterior view), glabrous, with an ill-defined platform (Fig. 109e). The notch is also deep in *desertorum* and *incanus*, but in *desertorum* it is covered with minute, erect setae, and in *incanus* it has a well-defined platform.

DESCRIPTION.— Mandible: outer ridge somewhat swollen and expanded over notch;. Galea membranous. Scutal punctures well defined, averaging about one diameter apart (discal punctures up to 2–3 diameters apart in one male). Mesopleural punctures shallow, somewhat ill defined, less than one diameter apart. Mesothoracic venter, in males from Sinai and Israel, with sparsely punctate area anterad of each midcoxa (punctures several diameters apart). Propodeal dorsum evenly microareolate; side finely sculptured, not ridged; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum with inner margin obtusely carinate basally.

Setae appressed or nearly so on gena, in male erect on each side of oral fossa and about as long as midocellar diameter; appressed on postocellar area and scutum (sinuous, suberect along scutal foremargin), obscuring integument on mesopleuron and in female on hindfemoral outer surface along ventral margin; sinuous and variously oriented on propodeal dorsum (inclined either anterad or posterad). Sternum I in some specimens largely glabrous.

Head and thorax black, mandible yellowish red, black apically. Frontal setae silvery in both sexes. Wing membrane hyaline; costal vein of forewing yellow or yellowish brown, subcostal vein, respectively, yellowish brown or brown. Femora all red or male forefemur black in basal half; tibiae and tarsi red. Gaster red. Terga I–IV in female, I–V in male, silvery fasciate apically.

♀.— Mandible: trimmal carina with low, obtuse tooth and inconspicuous cleft (Fig. 109a). Clypeus (Fig. 109a): bevel shorter than basomedian area; lip free margin obtusely pointed mesally, not incised laterally. Width of postocellar area 0.5 × length. Dorsal length of flagellomere I 3.3–3.6

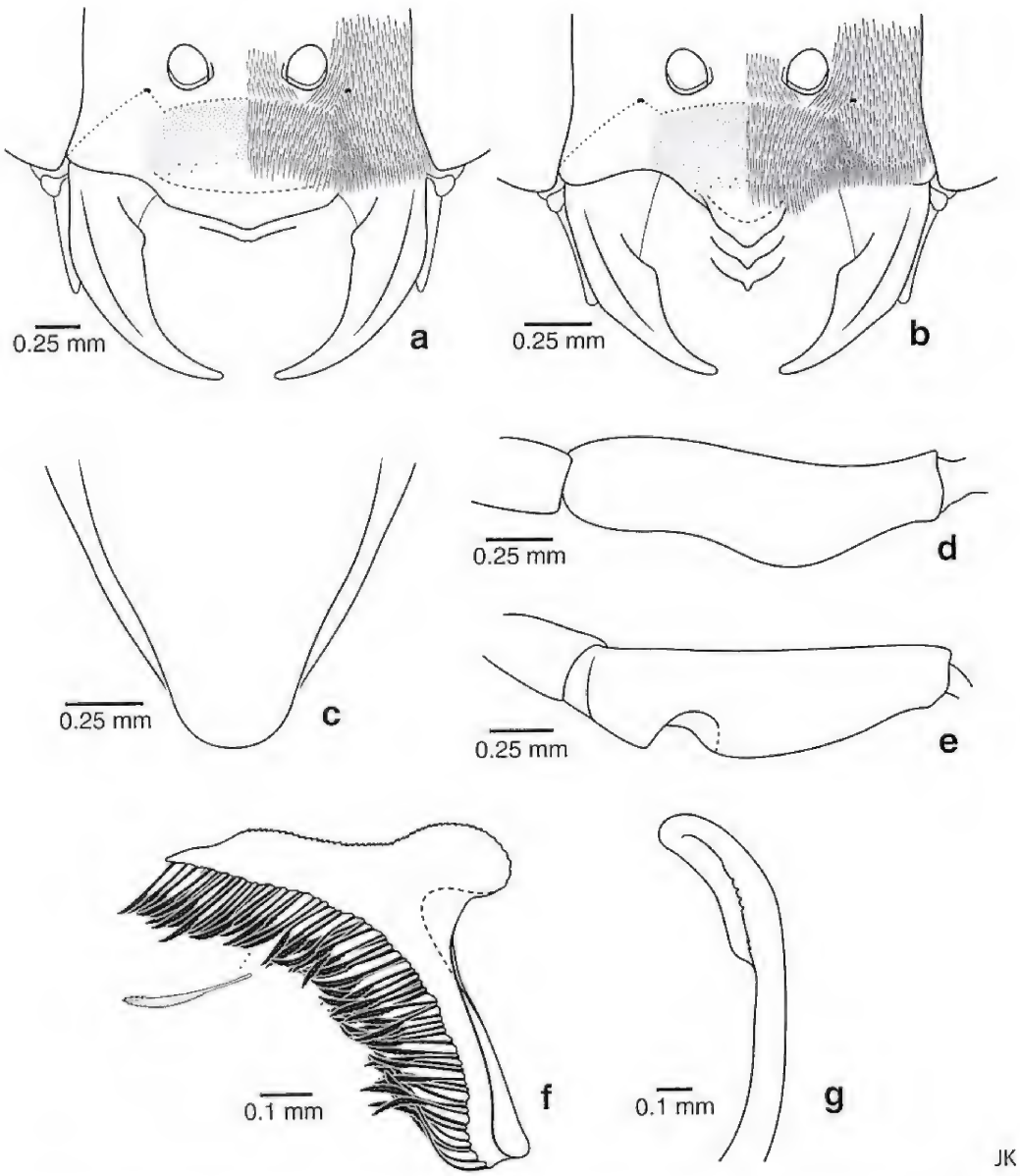

FIGURE 109. *Tachysphex curvipes* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible with outlines showing variation of clypeal free margin; c – outline of female pygidial plate; d – male forefemur in dorsal view; e – male forefemur in posterior view showing notch; f – volsella; g – penis valve.

× apical width. Trochanteral venters of all legs with a few, sparse punctures. Forefemoral venter sparsely punctate near base. Dorsal foretibial surface with three spines; outer surface with two spines. Forebasitarsus with 8–10 rake spines. Apical tarsomeres with two spines on venter (one subbasal, one near center). Tergum V with a few, sparse punctures, apical depression impunctate, glabrous. Pygidial plate unusually broad, broadly rounded apically, without transverse sulcus or impression, all unsculptured (Fig. 109c). Preapical setae (bordering apical depressions) of sterna IV and V markedly thickened. Length 11.5–13.2 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Fig. 109b): bevel absent; lip free margin either evenly triangular (specimen from Sinai), forming single curved line with rest of clypeal margin, or (other specimens) with apical point and obtuse corner; distance between corners 0.3 × distance between corner and orbit. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 2.5–2.7 × apical width. Forefemur markedly curved in dorsal view (Fig. 109d); forefemoral notch deep (about 0.3 × femoral diameter in posterior view), glabrous, with broad, ill-defined platform (Fig. 109e). Outer margin of forebasitarsus with six or seven rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Tergum VII with a few, sparse punctures (except punctures dense along lateral and posterior margins). Apical depression of sternum II impunctate, glabrous. Sterna III–VI sparsely punctate, largely glabrous (sterna III and IV densely punctate laterally). Length 8.0–9.0 mm. Volsella and penis valve: Figs. 109f, g.

Geographic distribution (Fig. 110).— Sinai Peninsula, Israel, Turkmenistan.

Records.— Holotype: ♂, **EGYPT**: **Sina** (= Sinai): 51 km SE Nakhl, 19 May 1993, WJP (CAS). Paratypes: **EGYPT**: **Sina** (= Sinai): 51 km SE Nakhl, 19 May 1993, AM (1 ♂), WJP (1 ♂), Wadi Sudr 50 air km SE Suez, 20 May 1993, WJP (1 ♂). **ISRAEL**: 135 km N Elat Iddan, 8 May 1996, C. Schmid-Egger (1 ♀, 1 ♂); Negev: Wadi Ziyya 60 km S Mizpé Ramon, 15 June 1994, M.E. Irwin (1 ♀, 1 ♂, UCD). **TURKMENISTAN**: 5 km S Tedjen, 29 May 1963, S. N. Gorshenina (1 ♂).

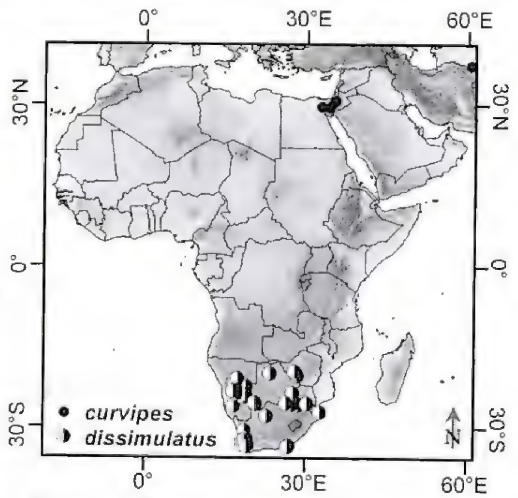

Figure 110. Collecting localities of *Tachysphex curvipes* and *dissimulatus*.

Tachysphex deserticola de Beaumont

Figures 111, 112.

Tachysphex deserticola de Beaumont, 1940:173, ♀. Holotype: ♀, Egypt: Kharga oasis (Ministry of Agriculture of Egypt), not examined.— Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:193 (in revision of Egyptian *Tachysphex*); Pulawski, 1964:95 (Egypt); Osborn and Krombein: 1969:16 (Sudan); Pulawski, 1971:385 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:273 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

Recognition.— *Tachysphex deserticola* has a conspicuously prominent frons (Figs. 111c, d) and dense vestiture that completely conceals the clypeus, frons, mesopleuron, and hindfemoral outer surface (at least in ventral half). In addition, the labrum is flat, not protruding beyond the clypeal free margin, and male sterna II–VI are all or largely glabrous. *Tachysphex isis*, *osiris*, and *vestitus* are similar. Unlike *isis* and *osiris*, the middle clypeal section of *deserticola* is flat and has

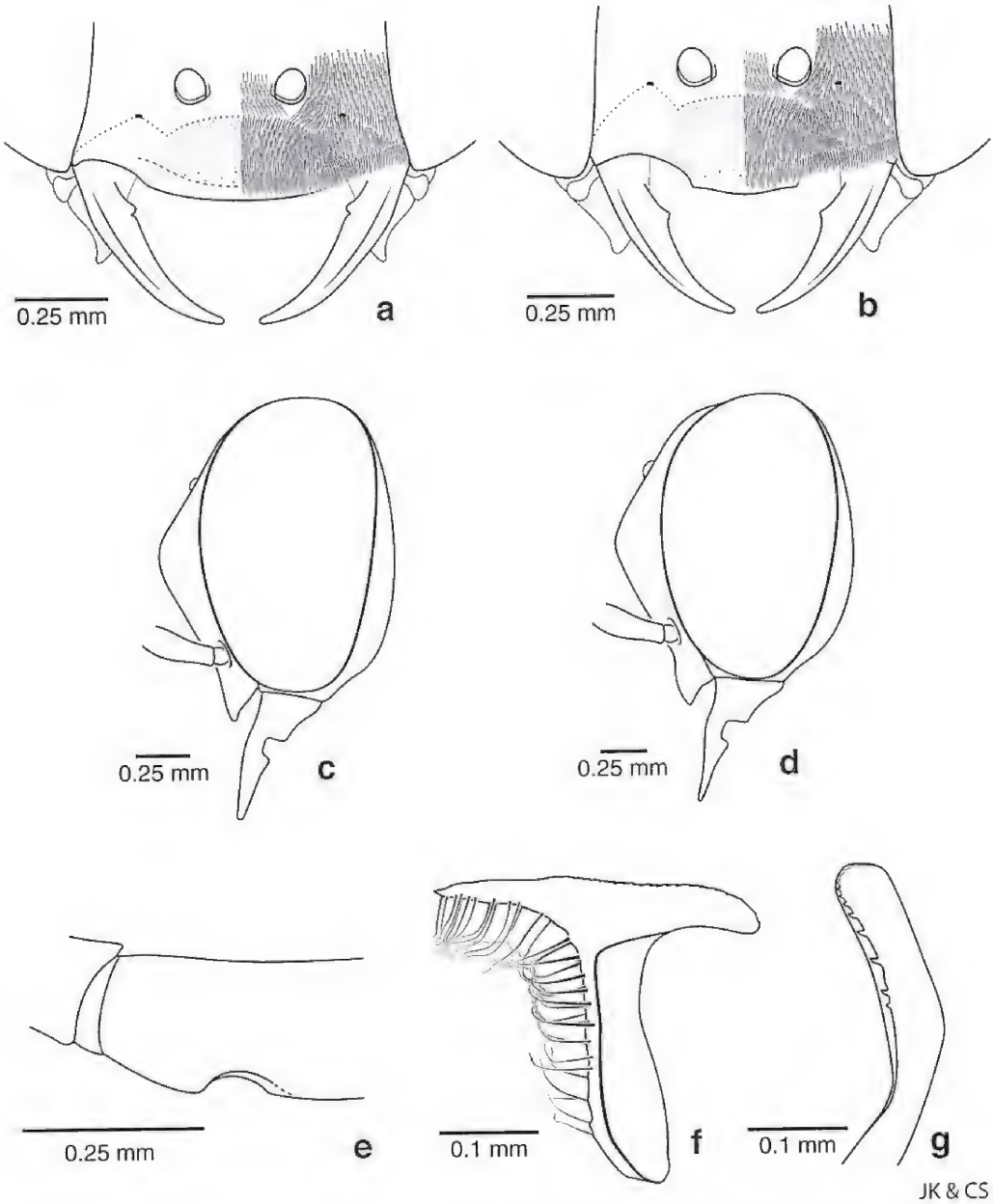

FIGURE 111. *Tachysphex deserticola* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – female head laterally; d – male head laterally; e – base of male forefemur showing notch; f – volsella; g – penis valve.

no bevel, the galea is membraneous, the flagellum is reddish in the basal half rather than all black, and parts of tergum I are completely concealed by vestiture. Unlike *osiris*, the hindwing vein cu-a is vertical. In the female, the pygidial plate is narrow apically and nearly uniformly sculptured, while broad and divided into two differently sculptured areas in *vestitus* (Figs. 407b, c). In the male,

the forefemoral notch is shallow, glabrous, with ill-defined platform (Fig. 111e). In *vestitus*, by contrast, the forefemoral notch is deeper, with a well-defined platform and sparse, erect setae (Fig. 406f).

Description.— Galea membranous. Frons conspicuously prominent (Figs. 111c, d). Scutal punctures minute, nearly compressed against each other. Mesopleuron microsculptured, with ill-defined punctures. Mesothoracic venter, in female, with large, unsculptured area cephalad of each coxa; in male unsculptured except for a few, sparse punctures. Forewing with unusually sparse microsetae. Propodeal dorsum microsculptured; side microsculptured, not ridged; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum with inner margin not carinate. Sternum I with obtuse longitudinal carina.

Setae appressed and fully concealing integument on clypeus, frons, scutum anteriorly, mesopleuron, forecoxa, outer surface of hindfemur (at least in ventral half), and parts of terga I and II; appressed or nearly so on each side of oral fossa next to occipital carina; on propodeal dorsum oriented anterad near base, oriented toward midline near center, oriented posterad near apex; propodeal side all setose. Tibiae in many specimens with sparsely punctate, sparsely setose, shiny zone (outer surface of foretibia, dorsal surface of mid- and hindtibiae). Propleuron and sternum I all or largely glabrous.

Head and thorax black except mandible yellowish red (brown apically), but thorax all red (except scutum partly black) in single female from Dakhla oasis, Egypt, clypeal middle section reddish apically, scapal venter yellow or yellowish, and flagellum reddish in basal half. Frontal setae silvery in female, golden above protuberance in male. Wing membrane hyaline; costal and subcostal veins of forewing pale yellow. Femora, tibiae, and tarsi red. Gaster red in female, in male three or four apical segments dark brown. Terga I–IV silvery fasciate apically, but fascia ill defined on tergum IV in many males.

♀.— Mandible: trimmal carina with unusually small tooth (Fig. 111a). Clypeus (Fig. 111a): basomedian area flat, bevel absent; lip free margin arcuate, not emarginate mesally, not incised laterally. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere I 2.0–2.5 × apical width. Forefemur narrowly unsculptured basoventrally. Dorsal foretibial surface with two spines; outer surface asetose, with two spines. Forebasitarsus with 5–7 rake spines. Mid- and hindtrochanteral venters unsculptured. Apical depression of tergum V unsculptured, glabrous. Pygidial plate somewhat constricted preapically, with punctures that average several diameters apart, interspaces aciculate preapically; lateral carina ill defined. Length 5.9–8.5 mm.

♂.— Mandible: trimmal carina with small tooth, without cleft. Clypeus (Fig. 111b): basomedian area flat, bevel absent; lip free margin slightly arcuate (nearly straight), with obtuse corner; distance between corners about 0.9 × distance between corner and orbit; free margin of lateral clypeal section shallowly concave. Width of postocellar area 1.3 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral notch shallow, with glabrous bottom, with ill-defined platform (Fig. 111e); outer margin of forebasitarsus with four rake spines;

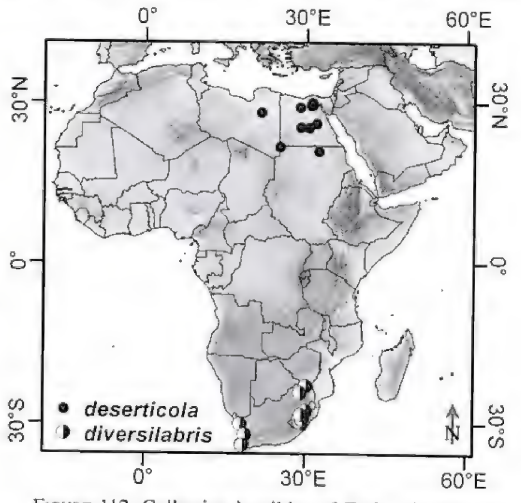

FIGURE 112. Collecting localities of *Tachysphex deserticola* and *diversilabris*.

outer apical spine of foretarsomere II as long as tarsomeres III and IV combined. Punctures of tergum VII several diameters apart but close to each other apically. Sternum II except laterally and sterna III–VI unsculptured, glabrous. Length 5.2–6.0 mm. Volsella and penis valve: Figs. 111f, g.

GEOGRAPHIC DISTRIBUTION (Fig. 112).— Western Libya, Egypt, northern Sudan.

RECORDS.— **EGYPT**: **Al Fayyum**: Kom Osheim (1 ♀). **Al Jizah** (= Ghiza): Abu Rawash (1 ♂), Dahshur (1 ♂), Manshiet Radwan (Pulawski, 1971), Saqqara (1 ♀). **Al-Wadi al-Jadid**: Dakhla oasis: Mut (1 ♀, ZMAN), Kharga oasis (de Beaumont, 1940). **Matruh**: NW Bahariya oasis at 19°12′21″N 28°51′41″E (1 ♀, AMNH). **Sawhaj**: wadi 4 km W Abydos (1 ♀, 4 ♂). **LIBYA**: **Cyrenaica**: 85 km S Jalu (de Beaumont, 1947a, as Gialo). **SUDAN**: Bir Um-Nabardi 160 km SE Wadi Halfa (Pulawski, 1971), Wadi Ain el Brins in Gebel 'Uweinat at 21°50′N 25°05′E (1 ♀).

Tachysphex desertorum F. Morawitz

Figures 113, 114.

Tachysphex desertorum F. Morawitz, 1894:342, ♀. Holotype or syntypes: ♀, Turkmenistan: Serax (ZIN), examined before 1971.— Dalla Torre, 1897:679 (in catalog of world Hymenoptera); Pulawski, 1971:376 (in revision of Palearctic *Tachysphex*); Kazenas, 1972b:161 (Kazakhstan); Myartseva, 1972a:78 (Turkmenistan); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Bohart and Menke, 1976:273 (listed); Kazenas, 1978:115, 128 (in key to Sphecidae of Kazakhstan and Central Asia); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002:66 (Kazakhstan).

Tachysphex abjectus Kohl, 1901c:782, ♂. Holotype: ♂, Transcaspia: Bala-Ishem (NHMW), examined before 1971. Synonymized with *Tachysphex desertorum* by Pulawski, 1971:376.— de Beaumont, 1936b:614 (China), 1940:173 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:190 (in revision of Egyptian *Tachysphex*), 1958:61 (Algeria), 1960b:239 (Libya), 1961c:5 (Iraq); Dollfuss, 1989:12 (type material in NHMW).

Tachysphex julliani nigripes Tsuneki, 1972e:391, ♀, junior primary homonym of *Tachysphex nigripes* Pulawski, 1967. Holotype: ♀, Mongolia: Bayanhongor Aymag: oasis Ehingol 90 km NE border post Tsaganbulag (TMB), examined. **New synonym**.— Bohart and Menke, 1976:274 (listed).

RECOGNITION.— *Tachysphex desertorum* is one of the species that have the galea membranous, maxillary stipes with short, inconspicuous setae, frons not bulging near midlength, hindwing vein cu-a vertical, and length of marginal cell more than 3.0 × width. The gaster is all black in the vast majority of specimens, but red basally in a male from southern Algeria.

In the female, the pygidial plate is broadly rounded apically, not constricted preapically, without a transverse sulcus or a difference in the surface level (Fig. 113c). Also, the clypeal bevel is present, the lip free margin is not incised laterally, and the setae bordering the apical depressions of segments IV and V are thickened. The sparsely punctate mesothoracic venter and forefemoral base, and unsculptured or sparsely punctate trochanteral venters, are subsidiary recognition features.

The male has the clypeal free margin conspicuously, narrowly projecting mesally (Fig. 113b) and sterna IV–VI glabrous mesally (at most with a few, sparse punctures). It differs from similar species by its relatively deep forefemoral notch (about 0.3 × femoral diameter in posterior view), with ill-defined platform and minute but conspicuous, erect setae (Fig. 113d). Also, the clypeal lobe is unusually narrow, the lip corners, when present, being markedly closer to each other than to orbit (Fig. 113b). As in the female, the mesothoracic venter is sparsely punctate, and the trochanteral venters are unsculptured or sparsely punctate.

JUSTIFICATION OF NEW SYNONYMY.— The holotype of *julliani nigripes* is clearly conspecific with *desertorum*. The two names are therefore synonyms.

DESCRIPTION.— Mandible: outer ridge somewhat swollen and expanded over notch. Galea membranous. Scutal punctures well defined, up to several diameters apart on disk in most speci-

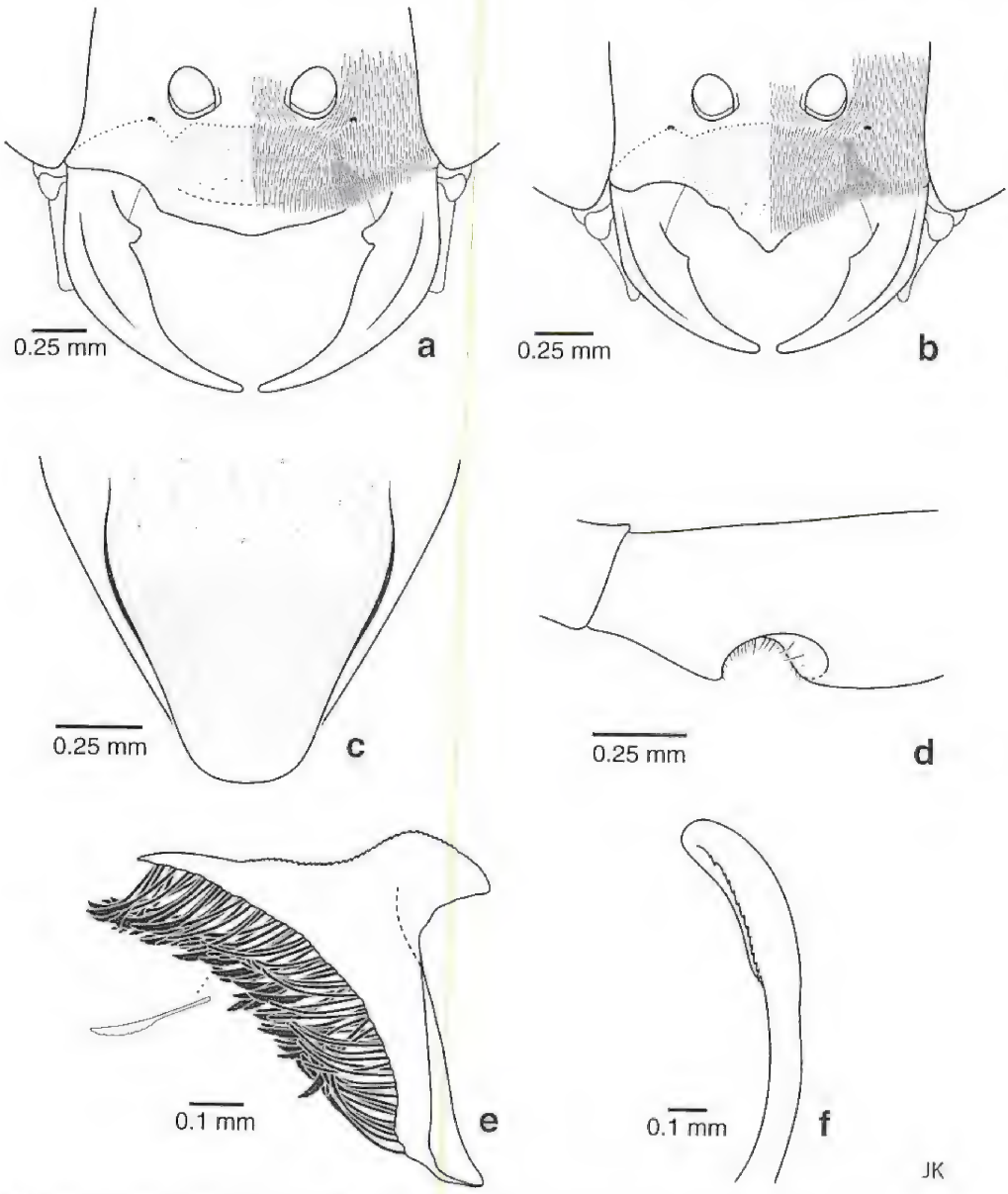

FIGURE 113. *Tachysphex desertorum* F. Morawitz; a – female clypeus and mandible; b – male clypeus and mandible; c – pygidial plate of female; d – base of male forefemur showing notch; e – volsella; f – penis valve.

mens, about one diameter apart in some. Mesopleuron dull, with somewhat ill-defined punctures, most of which are less than one diameter apart. Mesothoracic venter shiny, with punctures several to many diameters apart. Propodeal dorsum evenly microareolate, not ridged; side minutely, sparsely punctate; posterior surface, in dorsal third or so, with wide median impression. Trochanteral venters, on all legs, shiny, impunctate and asetose or with a few, sparse punctures and associated setae.

Hindcoxal dorsum obtusely carinate basally. Sternum I in most specimens with obtuse, ill-defined median carina.

Setae straight, slightly longer than midocellar diameter on each side of oral fossa next to occipital carina; appressed on postocellar area and scutum, suberect on scutum anteriorly in some males; oriented posterad on propodeal dorsum. Sternum I in most specimens glabrous.

Head and thorax black, mandible dark reddish to yellowish reddish (except basally and apically). Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal vein of forewing yellowish brown, subcostal vein dark brown. Femora black; tibiae black in female and most males, partly reddish brown in males from Egypt and Iran; tarsi all or largely reddish. Gaster black except segments I–III red in single male from Tassili des Ajjer, Algeria. Terga I–III silvery fasciate apically.

♀.— Mandible: cleft unusually broad, widely open (Fig. 113a). Clypeus (Fig. 113a): bevel shorter than basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 0.5–0.7 × length. Dorsal length of flagellomere I 2.1–2.7 × apical width. Venters of fore- and midfemora sparsely punctate in basal half or so, integument shiny; venter of hindfemur asetose except basally. Dorsal foretibial surface with two or three spines; outer surface with two spines, in some specimens partly asetose. Forebasitarsus with 10–12 rake spines. Apical tarsomeres on venter with erect, long preapical seta, in many specimens also with basoventral spine. Inner apical spine of hindtarsomere IV nearly reaching claw bases. Tergum V with a few, sparse punctures anterad of apical depression, apical depression impunctate, glabrous. Pygidial plate unusually broad, broadly rounded apically, with small punctures that are many diameters apart in anterior half or so, in fresh specimens microscopically ridged and areolate in posterior half or so (Fig. 113c), without internal transverse ridge, without transverse sulcus or difference in level. Preapical setae (bordering apical depressions) of sterna IV and V thickened, although less so than in *julliani*. Length 9.5–13.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 113b): bevel rudimentary or absent; lip free margin varying: either with well-defined corner or corner absent, thus forming single curved line with rest of clypeal margin; distance between corners 0.4–0.5 × distance between corner and orbit. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.6–2.1 × apical width. Trochanteral venters largely asetose. Forefemoral notch deep (about 0.3 × femoral diameter in posterior view), with wide, ill-defined platform and minute, erect setae (Fig. 113d). Outer margin of forebasitarsus with 4–7 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Tergum VII with a few, sparse punctures except punctures less than one diameter apart next to hindmargin. Sterna III–VI sparsely punctate (sterna III and IV densely punctate laterally in some specimens), largely glabrous. Length 7.5–9.5 mm. Volsella and penis valve: Figs. 113e, f.

GEOGRAPHIC DISTRIBUTION (Fig. 114).— Algeria, Libya, Egypt, Middle East (Iran, Iraq, Israel), east to Kazakhstan, Turkmenistan, Tajikistan, Mongolia, and western China.

RECORDS.— **ALGERIA**: Biskra (de Beaumont, 1947a), Dider in the Tassili des Ajjer (1 ♂, MNHN). **CHINA**: **Ningxia Huizu Autonomous Region:** Etsingol in Alashan Plateau (Pulawski, 1971). **Tsinghai**: Tsaidam region: no specific locality (de Beaumont, 1936b). **EGYPT**: **Al Qahirah** (= Cairo): Katamia area 40 km E Maadi (1 ♀, 3 ♂; 1 ♂, MSNT), Wadi Hof (de Beaumont, 1940). **As Suways** (= Suez): Suez (Pulawski, 1971). **Sina** (= Sinai): 51 km SE Nakhl (1 ♂; 1 ♂, MSNT), 65 air km E Suez (1 ♀, 3 ♂). **IRAN**: **Baluchestan va Sistan**: Gurmuk S Bampur (Pulawski, 1971). **Teheran**: 30 km S Teheran (1 ♂). **IRAQ**: Ana (de Beaumont, 1961c). **ISRAEL**: Beersheba and Mamshit (de Beaumont, Bytinski-Salz, and Pulawski, 1973), 135 km N Elat Iddan (1 ♂, CSE), Elat Zukim Resort on Dead Sea (1 ♂), Moshaav Hazeva in Arava Valley (1 ♂, CSE), Wadi Ruth 50 km SW Beersheba (Pulawski, 1971). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Almaty**: Basshchiysk Valley (1 ♂), Kaskelen River 50 km N Almaty (1 ♂), Myn-Bulak 100 km NE Almaty (2 ♀, 2 ♂), Ust'urt 40 km W Panfilov (P), Zarechnyi 60 km N Almaty (1 ♀). **Aqmola**: Priozernyi (K),

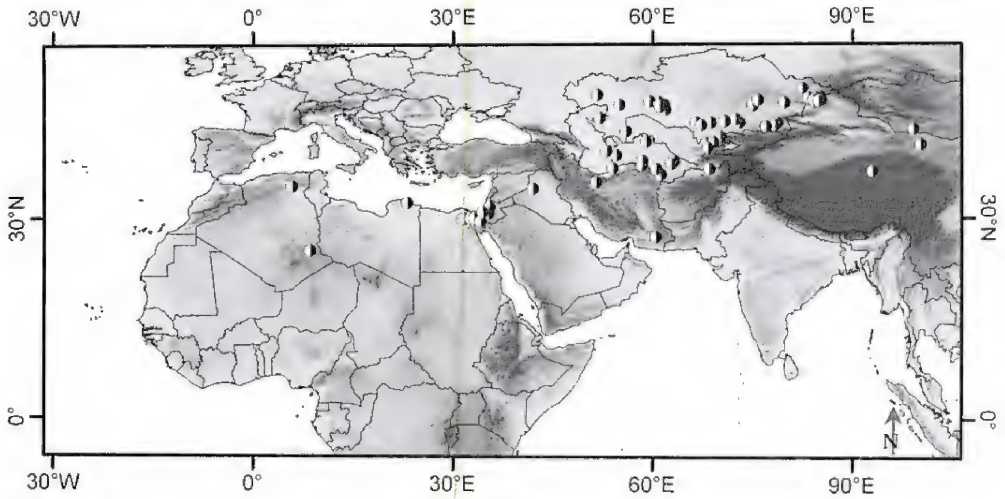

FIGURE 114. Collecting localities of *Tachysphex desertorum*.

12 km S Priozernyi (K). **Atyraū**: Ashchisay near Kul'sary (K), Grebenshchikov 70 km N Atyraū (K). **East Kazakhstan**: 18 km N Belaya Shkola = 20 km W Zaysan at about 48°N 83.5°E (K), 12 km SW Buran (K), 20 km SW Chernayevka village at approximately 48°N 84.5°E (1 ♂), 40 km NW Chernyaevka (K), 5 km W Karabulak at about 47°N 85°E (K), 5 km SW Tansyk (1 ♀), 3 km E Ul'ken-Karatal at about 47.7°N 85°E (K), 15 km NE Zaysan (K). **Mangghystaū**: Imagombet ca 100 km NE Tauchik at about 44°N 52°E (1 ♂). **Oral**: Chelkar (P). **Qaraghandy**: 3 and 50 km N and 50–130 km NE Balqash (K), 5 km SW Balqash (1 ♀, 1 ♂). **Qostanay**: Zhalanash (K), 9 and 35 km NW Zhalanash (K). **Qyzylorda**: 5–8 km N and 5 km E Akespe = 80 km W Aral'sk at about 47°N 60.5°E (K), 15 km N Aral'sk (K), Baigakum near Djulek (P), 3–10 km NW Kamyshlybash (K), 14 km SE Saksaul'skiy (K), 3 km S Yany-Kurgan (K). **South Kazakhstan:** 2–8 km SW and 30 km S Chardara (K), 30 km NE Suzak (K). **Zhambyl**: 4–5 km SE and 60–90 km NW Furmanovka (K), 17–25 km SE, 50 km SW, and 80 km SE Ulanbel' (K). **Location unknown**: Karasu village (K), Koybynskoye Gorge (1 ♀). **LIBYA**: **Cyrenaica**: Tmimi (de Beaumont, 1960b). **MONGOLIA**: **Bayanhongor Aymag**: oasis Ehingol 90 km NE border post Tsaganbulag at about 43°18′N 99°12′E (2 ♀, TMB, holotype and paratype of *julliani nigripes*). **TAJIKISTAN**: Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TURKMENISTAN**: Askhabad (Myartseva, 1972a), Bala-Ishem (Kohl, 1901), Gasan-Kuli (Myartseva, 1972), Kary Kul 65 km N Askhabad (1 ♀, 3 ♂), Krasnovodsk (Myartseva, 1972a), Repetek (1 ♂), Serax (F. Morawitz, 1894), Shahsenem in Tashauz Oblast' (1 ♀, 1 ♂), Tedjen (1 ♀, 1 ♂), Uch-Adji (1 ♀). **UZBEKISTAN**: Kyrk-Kuduk near Tashkent (Pulawski, 1971), Mussa-Kuduk in Golodnaya Step' ca 150 km SW Tashkent (1 ♀).

Tachysphex detritus Arnold, new status

Figures 115, 116.

Tachysphex schoenlandi var. *detritus* Arnold, 1924:69, ♂. Holotype: ♂, South Africa: Eastern Cape Province: Willowmore (TMP), examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex schoenlandi detritus*: Bohart and Menke, 1976:276 (new status, listed).

Tachysphex maidli de Beaumont, 1940:169, ♀, ♂. Holotype: ♀, Egypt: Sinai: Al Arish (originally A. Alfieri collection, now USNM), examined. **New synonym**.— Honoré, 1942:56 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:175 (in revision of Egyptian *Tachysphex*), 1950a:405 (Algeria), 1955:181 (Morocco); Pulawski, 1971:414 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:13 (Israel); Bohart and Menke, 1976:274 (listed); Kazenas, 1978:115, 127 (in key to Sphecidae of Kazakhstan and Central Asia); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia).

Tachysphex similimus Gussakovskij, 1952:235, ♀, ♂ (♂ = *Tachysphex erythropus*). Lectotype: ♀, Tajikistan: Ayvaj (ZIN), designated by Pulawski, 1971:414 and 416, examined before 1971. Synonymized with *Tachysphex maidli* by Pulawski, 1971:415.

Species 2 (part): van Noort, Prinsloo, and Compton, 2000:348 (Namibia), **present correction**.

Recognition.— Like *flavofimbriatus* and *sericeus*, *detritus* has the apical depression of sternum I intersected by a longitudinal carina, hindwing vein cu-a oblique (anal end further away from wing base than cubital end), setae sinuous on the head and thorax, and male sternum III with setae markedly longer apically than basolaterally. Unlike these species, the scutum of many *detritus* is punctatorugose.

The female of *detritus* differs in having suberect, sinuous setae on the side of tergum I basally and on the scapal and fore- and midfemoral venters, and also red mid- and hindfemora (the femora are black in *flavofimbriatus*). Additionally, the clypeal bevel of most *detritus* is evenly rounded but exceptionally step-like. In the vast majority of *sericeus*, the clypeal bevel is markedly step-like, but exceptionally rounded.

The male of *detritus* can be recognized by an emarginate forefemur (the emargination is rudimentary in some specimens), the presence of rake spines on the forebasitarsus in most specimens (at least one spine originates near the tarsomere's midlength or in its basal half), and setae of the apical depression of sternum III dense apicomesally but not agglutinated. In *flavofimbriatus*, the forefemur is entire, and in *sericeus* the forebasitarsus has no preapical rake spines or, exceptionally, one or two preapical spines close to the tarsomere's apex, and in most specimens the setae of the apical depression of sternum II are dense, as if agglutinated. Two characters differentiating some (but not all) males of *detritus* are: setae suberect on tergum I basolaterally and forefemoral notch rudimentary.

Description.— Gena unusually narrow in dorsal view. Scutum microsculptured, dull, with punctures that are ill defined in some specimens, but punctatorugose in those from Ethiopia, Kenya, and Tanzania, and some from Ivory Coast, Morocco, Namibia, and Zambia, at least anteriorly; discal punctures averaging mostly two to three diameters apart, but about one diameter apart in some specimens (including those from North Africa). Mesopleuron dull, markedly microsculptured, either with shallow, ill-defined punctures or punctatorugose. Propodeal dorsum longitudinally ridged to irregularly rugose, intersecting posterior face at about right angle; propodeal side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end further away from wing base than cubital end), minimally so in exceptional specimens. Hindcoxal dorsum with inner margin carinate or carina evanescent. Sternum I with apical depression that is bisected by obtuse, longitudinal carina (as in Fig. 132a).

Setae sinuous and erect on interocellar area, postocellar area, along hypostomal carina, on thorax, forecoxa, and forefemoral venter (Fig. 115); in females and many males also on scapal venter, midfemoral venter, and sides of tergum I basolaterally; setal length (expressed as a fraction of basal mandibular width): 0.5–0.6 on postocellar area and along hypostomal carina, up to 0.8 on mesopleuron anteroventrally and propodeal dorsum.

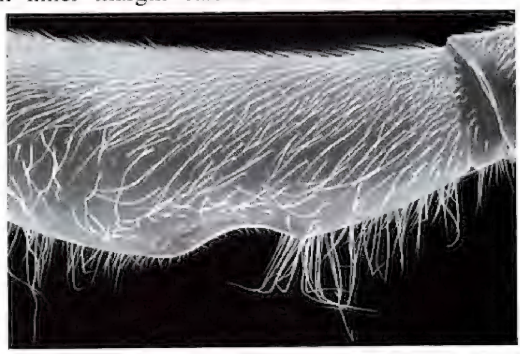

Figure 115. *Tachysphex detritus* Arnold: base of male forefemur showing notch.

Head, thorax, and gaster black, mandible red mesally. Frontal setae silvery in female, golden in most males (silvery in smallest specimens). Wings hyaline; forewing costal vein light brown, subcostal vein dark brown. Color of femora: see below. Tibiae and tarsi ferruginous except tibiae largely dark in some males. Terga I–III or I–IV silvery fasciate apically.

♀.— Labrum entire or with small notch. Clypeus: bevel markedly shorter than basomedian area; lip free margin arcuate, entire or shallowly emarginate mesally, laterally not incised or with one or two small incisions on each side. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Dorsal foretibial surface with three spines; outer surface with several spines. Forebasitarsus with eight rake spines that are divided into proximal and distal groups. Apical mid- and hindtarsomeres with 1–3 (mostly two) small spines near midlength of each lateral margin and with a cluster of preapical spines on venter. Apical depression of tergum V impunctate, glabrous. Length 9.5–12.0 mm. Forefemur black except red apically, mid- and hindfemora red.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel markedly shorter than basomedian area; free margin of lobe arcuate or slightly sinuate, with well-defined corner; distance between corners 1.0–1.1 × distance between corner and orbit. Width of postocellar area 0.5–0.7 × length. Dorsal length of flagellomere I 1.6–1.9 × apical width. Forefemoral notch glabrous, varying from evanescent to moderately large (Fig. 115), without basal tuft of erect setae (but setae erect between femoral base and notch). Outer margin of forebasitarsus with 2–5 rake spines (at least one spine located near this tarsomere's midlength or in basal half), but without preapical spines in single male from Ivory Coast. Setae of sternum II varying from appressed, short to erect, long (up to 0.5 × basal mandibular width); apical depression of sternum III with suberect, dense but not agglutinated setae (remaining sternum either with similar setae or nearly glabrous); sterna IV–VI either glabrous or apical depressions covered with setae similar to those on sternum III. Length 7.2–9.6 mm. Volsella and penis valve as in *costae* (Figs. 102b, c). Femora black except red apically, but hindfemur red in one specimen from Rehoboth area, Namibia.

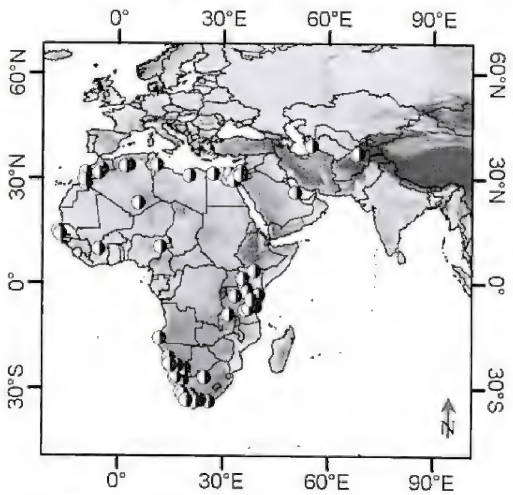

FIGURE 116. Collecting localities of *Tachysphex detritus*.

GEOGRAPHIC DISTRIBUTION (Fig. 116).— South Africa to North Africa, Israel, Arabian Peninsula, Turkmenistan, and Tajikistan.

RECORDS.— **ALGERIA**: **Hoggar**: T. Amanhedan-Izernène (1 ♀), Laghouat (Pulawski, 1971), Tadjerouna (de Beaumont, 1950a). **ANGOLA**: Curoca River 7 mi NE Porto Alexandre (1 ♂; 2 ♂, BMNH). **BAHRAIN**: no specific locality (Pulawski, 1971). **EGYPT**: **Al Iskanderiyah**: Mariout (de Beaumont, 1940). **Al Qahirah** (= Cairo): Cairo-Suez Road (1 ♂), Helwan (Pulawski, 1971), Wadi Digla (Pulawski, 1971). **As Suways**: Wadi Hagul 30 km SW Suez (2 ♂). **Dumyat**: Damietta, now Dumyat (de Beaumont, 1940). **Matruh**: 25–30 km W Marsa Matruh (1 ♀). **Sina** (= Sinai): Al Arish (1 ♀, USNM, holotype of *maidli*), Wadi Sudr 50 km SE Suez (1 ♂). **ETHIOPIA**: **Sidamo**: 22 km N Moyale (1 ♂). **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973): Kfar Yeroham, Ramat Gan, Revivim. **IVORY COAST**: 30–35 km N Korhogo (1 ♂, ZMAN). **KENYA**: **Coast Province**: Malindi (1 ♂), Mombasa (1 ♂, USU), Voi at 3°24.0′S 38°33.2′E (1 ♂), Voi area (4 ♀, 4 ♂; 8 ♀, 87 ♂, OÖLM), Watamu (1 ♂). **Rift Valley Province**: Magadi road 25 air km SW Nairobi (1 ♂) and 46 air km SW Nairobi (17 ♂; 4 ♂, NMK), Marich Pass Field Studies Centre (1 ♂), 4 km NNE Namanga (1 ♀). **LIBYA**: **Cyrenaica**: Agedabia (Pulawski, 1971). **MOROC-**

CO: Agadir (Pulawski, 1971), Maader Talmaout (1 ♂), Midelt (1 ♂), Tinerhir (de Beaumont, 1955), Tiznit (1 ♂, SCHL). **NAMIBIA**: **Bethanien District**: 32 km and 34 km SW Helmeringhausen (2 ♂, AMG). **Karasburg District**: Fish River Canyon (1 ♂, AMG), Fish River Canyon 15 km E Ai–Ais (1 ♂, SDNHM). **Keetmanshoop District**: Noachabeb [Farm] 27 mi NNE Grünau (1 ♂, BMNH). **Khorixas District**: Brandberg: Hungarob River (1 ♂, SAM, determined as Species 2 by van Noort, Prinsloo, and Compton, 2000). **Lüderitz District**: Aus (2 ♂), Namib Farm 70 km N Aus (1 ♂, OHL). **Mariental District**: 71 km E Stampriet (1 ♂, AMG). **Rehoboth District**: 9 km S Rehoboth (2 ♂). **Swakopmund District**: Kuiseb River near Gobabeb (1 ♀, PPRI), Namib Desert Research Station (1 ♀, USU). **Walvis Bay Territory**: 13 km E Walvis Bay (1 ♀). **NIGERIA**: Azare (1 ♂, BMNH). **SENEGAL**: Kayar (2 ♂, FB, MSNT), Ndangane 45 air km SE Mbour (1 ♂; 1 ♀, 1 ♂, FB). **SOUTH AFRICA**: **Eastern Cape Province**: Sundays River (2 ♂, TMP), Willowmore (2 ♂, TMP, including holotype of *detritus*). **Northern Cape Province**: 40 km S Garies (1 ♂, OÖLM), Perdefontein in Williston District (2 ♂, FSCA). **North-West Province**: Vryburg (1 ♂, SAM). **Western Cape Province**: Langberg (1 ♂, OÖLM), Matjiesfontein (1 ♂, BMNH), Merweville (1 ♂, SAM), Outdshoorn-Zebra (1 ♂, SAM), 5 km E Vredendal (1 ♂, AMG), Witzenberg Valley at 33°20′ S 19°30′E (1 ♂, BMNH). **TAJIKISTAN**: Ayvaj (Gussakovskij, 1952), Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TANZANIA**: **Dar es Salaam Region**: Bahari 30–35 km NE Dar es Salaam (1 ♂, MSNT). **Iringa Region**: 75 km ENE Iringa (5 ♂). **Morogoro Region**: 11 km W Morogoro (1 ♂), 48 km W Morogoro (1 ♀, 3 ♂; 2 ♂, UDS), 62 road km SW Morogoro (1 ♀, 1 ♂). **Shinyanga Region**: Old Shinyanga Road (1 ♀, BMNH). **Tanga Region**: 84 km NW Korogwe (1 ♂). **TUNISIA**: Djerba Island (Pulawski, 1971). **TURKMENISTAN**: Akhcha-Kuyma near Djebel in Bolchiye Balkhany Range (Pulawski, 1971). **ZAMBIA**: Mbala (1 ♂; 1 ♀, 4 ♂, AMG; 1 ♂, ZMAN).

Tachysphex diabolicus Arnold

Figures 108, 117.

Tachysphex diabolicus Arnold, 1923:149, ♀, ♂. Lectotype: ♀, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); de Beaumont, 1967:509 (misidentification, actually *Tachysphex barkeri*); Bohart and Menke, 1976:273 (listed).

Tachysphex diabolicus var. *analis* Arnold, 1924:51, ♀. Holotype: ♀, South Africa: Eastern Cape Province: Algoa Bay (TMP), examined. **New synonym**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex diabolicus analis*: Bohart and Menke, 1976:273 (new status, listed).

LECTOTYPE SELECTION.— Arnold (1923) spoke of a single type in the original description of *diabolicus* (without a reference to sex), but he designated a female and a male as types (and an additional male as a paratype). I have selected the female as the lectotype and the other two specimens as the paralectotypes.

RECOGNITION.— *Tachysphex diabolicus* has the labrum convex, protruding beyond the clypeal free margin, although slightly so in some males, galea elongate (length about 0.9 of scape), propodeal dorsum glabrous apicomesally, and gaster all black or with red apex and no silvery fasciae on terga. *Tachysphex punctatus* shares these characters, but unlike that species, the fore- and midfemora of *diabolicus* are closely, minutely punctate.

RELATIONSPHIP TO *TACHYSPHEX CLARIPES*.— *Tachysphex diabolicus* closely resembles *claripes* except that it lacks the silvery tergal fasciae and the male clypeal lobe is usually narrower (distance between corners 0.5–0.8 × distance between corner and orbit rather than 0.8–1.1). It may be an individual form of *claripes*, but I have not observed intergradation and therefore treat them as full species.

JUSTIFICATION OF NEW SYNONYMY.— The typical *diabolicus* is characterized by an all black gaster and an all setose hindfemoral venter (with an obtuse inner margin in the male). In the var. *analis*, female gastral segment VI and parts of V are red, the hindfemoral venter is asetose in the apical 0.3–0.4 of length, and in the male the inner margin of the venter is sharp. There are intermediates, however. For example, the pygidial plate is reddish in a female from Koonap River, South

Africa, and reddish apically in that from Hilton Farm, South Africa, but both specimens have the hindfemoral venter all setose. Of 15 females of Pearly Beach, South Africa, 14 are var. *analis*, but in one the hindfemoral venter is asetose only in the apical 0.2 of length (suggesting full intergradation to the typical *diabolicus*). Of the eight males from the same locality, seven are var. *analis*, but one is typical *diabolicus*. The two forms are largely exclusive: the typical form extends from Zimbabwe and Namibia to South Africa (as far south as Grahamstown area, Willowmore, and Matjiesfontein), whereas the var. *analis* is found only in southern South Africa and in Namaqualand. They were found sympatrically only at Pearly Beach and Willowmore. I conclude that these two phena are members of one geographically variable species.

Description.— Labrum convex (but less so than in *panzeri* or *pentheri*), protruding from beneath clypeus, although slightly so in some males. Galea densely, minutely punctate (except anteriorly) and also with a few large punctures, about as long as 0.9 of scape. Scutal punctures well defined, averaging about one diameter apart in some specimens, about 2–3 in others. Mesopleuron dull, conspicuously, evenly microsculptured, with vestigial, shallow micropunctures. Propodeal dorsum evenly microareolate, side ridged (except anteriorly in some males). Hindcoxal dorsum with inner margin carinate, carina somewhat expanded basally.

Setae varying from nearly appressed to suberect on postocellar area but no longer than midocellar diameter; erect, about one midocellar diameter long on each side of oral fossa next to occipital carina; on scutum either appressed or suberect and markedly shorter than midocellar diameter; propodeal dorsum with nearly appressed, inconspicuous setae that are oriented posterad except glabrous apicomesally (glabrous area several midocellar diameters wide).

Head and thorax black, mandible dark reddish preapically. Frontal setae silvery or silvery with golden tint or dark (then inconspicuous) in female, silvery or golden in male. Thoracic setae varying from silvery to brown. Wing membrane infumate (yellowish in single female from Shangani, Zimbabwe, yellow in single male from Kommetjie, South Africa); forewing costal and subcostal vein reddish brown or subcostal vein dark brown. Color of legs: see below. Gaster either all black or with red apex, and tergum II with red basomedian spot in a male from Matetsi, Zimbabwe (SAM). Terga without silvery, apical fasciae.

♀.— Clypeus (Fig. 117a): bevel markedly longer than basomedian area; lip free margin arcuate, shallowly, broadly emarginate mesally (emargination rudimentary in some specimens), incised laterally. Width of postocellar area 0.6–0.7 × length (1.0 × in female from Hilton Farm, South Africa). Dorsal length of flagellomere I 2.4–2.6 × apical width. Forefemoral venter minutely, uniformly punctate and with sparse, large, ill-defined punctures. Dorsal foretibial surface with two or three spines; outer surface with one to three spines. Forebasitarsus with seven or eight rake spines. Tergum V uniformly, minutely punctate (including apical depression). Pygidial plate alutaceous or unsculptured between punctures, punctures several diameters apart near midline, but many punctures nearly contiguous next to margin. Length 14.5–16.0 mm. Legs black except tarsal apex red or tibiae and tarsi red (see Variation below).

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 117b): bevel longer than basomedian area, delimited anterolaterally by oblique carina emerging from lip corner; lip free margin arcuate, with well-defined corner; distance between corners 0.5–0.8 × distance between corner and orbit. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Forefemoral notch glabrous or sparsely, microscopically setose; outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna IV–VI apically and sternum VII with suberect setae that are no longer than midocellar diameter, but setae appressed in males from Hilton Farm and Matjiesfontein. Sternum VIII: apical emargination with or without median point. Length 12.0–15.5 mm. Volsella and penis valve:

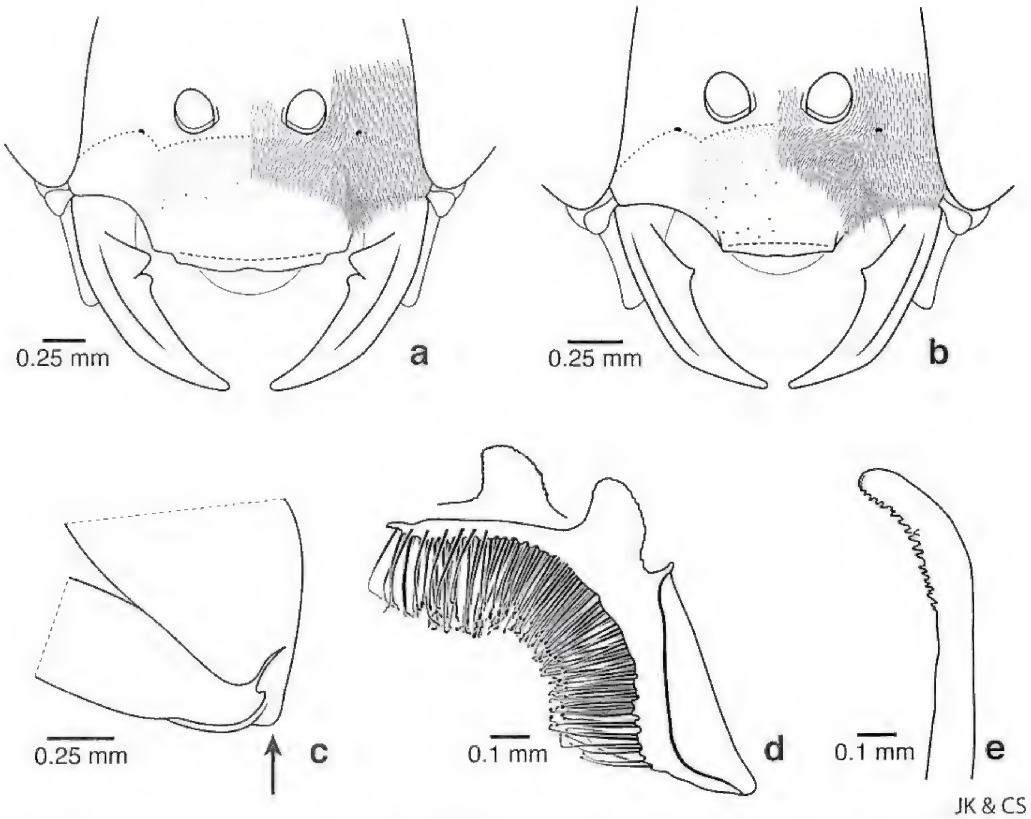

FIGURE 117. *Tachysphex diabolicus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – forecoxal process of female; d – volsella; e – penis valve.

Figs. 117d, e. Femora all black or red apically (up to apical third), also forefemoral venter red in some specimens. Tibiae and tarsi red in most specimens but black except foretibial inner surface reddish in males from Struisbaai, and all tibiae black in two males from Willowmore, South Africa.

VARIATION IN FEMALE.— Forecoxa. The forecoxa has a short, apical process in the two females from Zimbabwe, one from Namibia, and one of the two from Ladismith, South Africa (Fig. 117c).

Foretibial setae. The foretibia is finely setose throughout in two females from Zimbabwe, one from Hilton Farm, one from Koonap River, and one from Willowmore, South Africa. It has a narrow, glabrous zone in a female from Shangani, Zimbabwe, and in the Namibian and other South African females.

Color of tibiae. The tibiae are black in most specimens, but red in a female from Hilton Farm, one from Koonap River, and one from Willowmore (AMG).

GEOGRAPHIC DISTRIBUTION (Fig. 108).— Zimbabwe, northern Namibia, and South Africa.

RECORDS.— **NAMIBIA**: **Ondangwa District**: 38.4 km SE Ondangwa (1 ♀, NMN). **SOUTH AFRICA**: **Eastern Cape Province:** Algoa Bay (1 ♀ holotype of var. *analis*, 1 ♂, TMP), Cookhouse (1 ♂, SAM), 18 km WNW Grahamstown: Hilton Farm (1 ♀, 1 ♂), Koonap River 17 km from Adelaide on road to Grahamstown (1 ♀, AMG), Port Elizabeth (1 ♀, TMP), Somerset East (1 ♀, AEI), 3 km N Steytlerville (1 ♀), 6 km N Steytlerville (1 ♀), 28 km S Steytlerville: Wolwekraal Farm (1 ♂), Uitenhage (1 ♂, TMP), Willowmore (1 ♂; 1 ♀, 1 ♂, AMG; 1 ♀, TMP). **Northern Cape Province:** road to Richtersveld National Park

between Annis and Dabie at 28°20′S 16°55′E (1 ♂, AMG), Wallekraal in Namaqualand (2 ♀, SAM). **Western Cape Province**: Bookbai 15 km W Atlantis at 33°34′45″S 18°18′45″E (1 ♀, CSE), Brandfontein Reserve at 34°46′S 19°52′E (1 ♂, SAM), 60 km N Cape Town (1 ♀, OÖLM), Cederberg Mts. 15–30 km SE Clanwilliam (1 ♂, USU), Graafwater (3 ♀, SAM), Het Kruis (1 ♂, SAM), Knersflakte at 31°22′23″S 18°42′37″E (1 ♀, OHL), Kommetjie (1 ♂, KU), Ladismith (1 ♀, AMG; 1 ♀, SAM), S Lambert's Bay (1 ♀; 1 ♂, OÖLM), Leipoldtville to Eland's Bay (2 ♀, 1 ♂, SAM), Matjiesfontein (1 ♂), Pearly Beach (1 ♀, 1 ♂; 18 ♀, 8 ♂, SAM), Struisbaai (1 ♀, USU), 1 km N Struisbaai at 34°47.2′S 20°02.1′E (7 ♀, 7 ♂), Velddrif (1 ♂, AMNH), 3 km N Yzerfontein at 33°20′00″S 18°09′00″E (1 ♂, CSE), Zeekoe Vlei at 34°04′S 18°31′E (2 ♀, SAM). **ZIMBABWE**: Matetsi in Hwange District (1 ♀, 1 ♂; 1 ♂, AMG; 12 ♂, SAM), Sawmills at Umguza River (1 ♀ lectotype, 2 ♂ paralectotypes of *diabolicus*, SAM), Shangani (1 ♀, BMNH).

The var. *analis* was found in the following South African localities: Algoa Bay, Bokbaai, Brandfontein Reserve, 60 km N Cape Town, Cederberg Mts., Graafwater, Het Kruis, Knersflakte, Kommetjie, Ladismith, S Lambert's Bay, Leipoldtville to Eland's Bay, Pearly Beach, Port Elizabeth, Somerset East, 3 km N Steytlerville, 6 km N Steytlerville, 28 km S Steytlerville: Wolwekraal Farm, Struisbaai, 1 km N Struisbaai, Uitenhage, Wallekraal, Willowmore, 3 km N Yzerfontein, and Zeekoe Vlei.

Tachysphex dignus Kohl

Figures 118, 119.

Tachysphex dignus Kohl *in* Kohl and Handlirsch, 1889:278, ♂. Holotype: ♂, Turkmenistan: Nukhur in Kopet-Dagh (State Museum of Georgia, Tbilisi [?]), not examined.— Dalla Torre, 1897:679 (in catalog of world Hymenoptera, as *digenus*); Pulawski, 1967:398 (Turkey, description of ♀); de Beaumont, 1970b:15 (Iran: Baluchestan va Sistan); Pulawski, 1971:357 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Bohart and Menke, 1976:273 (listed); Kazenas, 1978b:115, 128 (in key to Sphecidae of Kazakhstan and Central Asia), 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia); Gayubo, Özbek, and Yildirim, 2003:88 (Turkey).

As *Tachytes incertus* (corrected to *Tachysphex dignus* by Pulawski, 1971:357): Radoszkowski, 1886:33 (male genitalia), 1891:590 (reference to Radoszkowski, 1886); de Beaumont, 1936b:615 (specimens in Radoszkowski collection, as *Tachysphex*).

INTERPRETATION OF THE SPECIES NAME.— The holotype of *dignus* was not available for study, but the good original description allows recognition. The combination of a narrow postocellar area, microareolate propodeal dorsum, black legs, and golden frontal pilosity is found in no other species that occur in Turkmenistan (Pulawski, 1971).

RECOGNITION.— The female of *dignus* has an unusually broad pygidial plate and unusually thick erect setae at the base of apical depressions of sterna III–V. It differs from other such species in having the following combination: mandible with outer ridge not swollen and not expanded over notch; galea sclerotized (not membranous); clypeus with well-defined bevel (Fig. 118a); pygidial plate without transverse sulcus, punctate throughout (without specialized sculpture in apical portion); and apical tarsomeres each with a pair of small, subbasal spines on the venter.

The male of *dignus* can be recognized by the following: sterna III–VI largely impunctate and glabrous, hindwing vein cu-a vertical, galea sclerotized, forefemoral notch larger than average for the genus (Fig. 118c), outer margin of foretarsomere with 4–6 rake spines, free margin of clypeal lobe arcuate; and propodeal posterior face with well-defined longitudinal groove (rather than flat impression).

DESCRIPTION.— Scutal punctures no more than one diameter apart. Mesopleuron with minute, ill-defined punctures that are about one diameter apart (more than one diameter posteroventrally). Propodeal dorsum evenly microareolate or slightly rugose, or transversely ridged along midline; side uniformly microsculptured. Hindcoxal dorsum with inner margin carinate basally. Sternum I near hindmargin with obtuse, median carina.

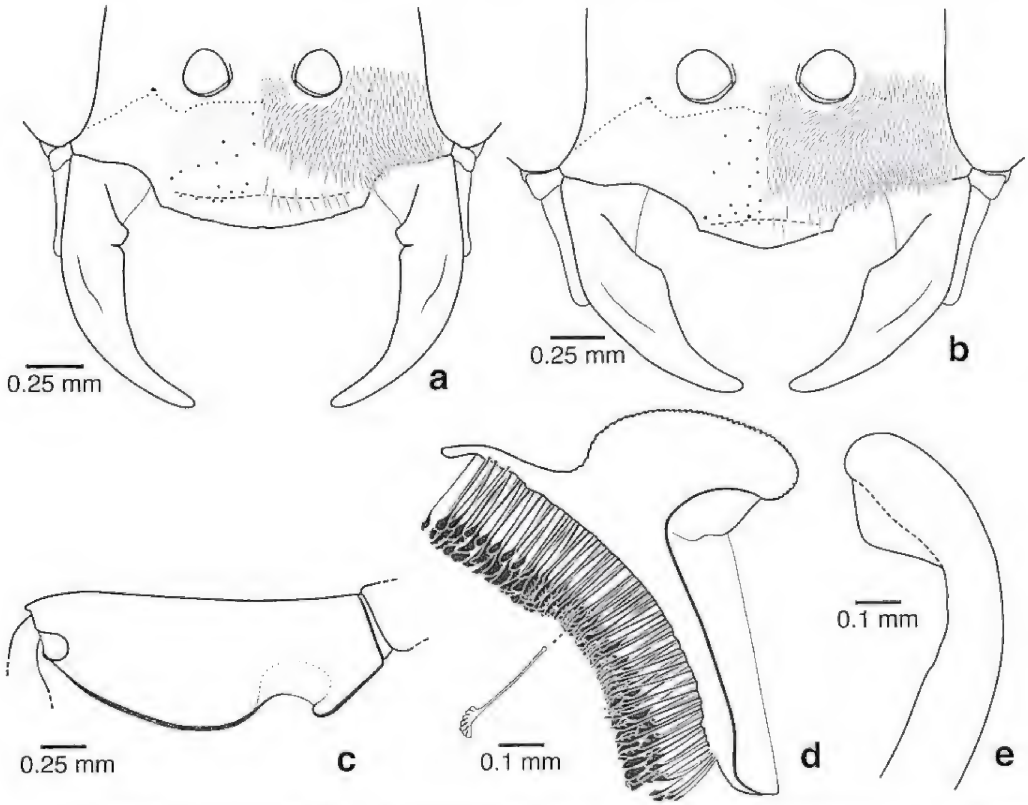

FIGURE 118. *Tachysphex dignus* Kohl: a – female clypeus and mandible; b – male clypeus and mandible; c – male forefemur showing notch; d – volsella; e – penis valve.

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; on propodeal dorsum converging obliquely posterad toward midline.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female and smallest males, golden in most males. Wing membrane nearly hyaline to slightly infumate; costal vein of forewing light brown, subcostal vein dark brown. Femora and tibiae black, foretibial inner surface reddish in male. Gastral segments I and II or I–III red and remainder black, but gaster all black in many males. Terga I–III or I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 118a): bevel slightly longer to slightly shorter than basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.3–2.6 × apical width. Dorsal foretibial surface with two or three spines; outer surface with three spines. Forebasitarsus with 7–9 rake spines; outer margin of forebasitarsus I and II slightly expanded apically over bases of rake spines. Outer margin of foretarsomere IV about 0.7 × length of inner margin. Venters of apical tarsomeres each with a pair of subbasal spines. Setae delimiting apical depressions of sterna III–V thickened (also those on tergum V laterally), markedly contrasting with those of tergum IV. Apical depression of tergum V impunctate, glabrous. Pygidial plate conspicuously broad, with punctures that average several diameters apart all over its surface; interspaces unsculptured. Length 9.8–16.0 mm.

♂.— Mandibular inner margin with wide, obtuse tooth, without cleft (Fig. 118b). Clypeus (Fig. 118b): bevel markedly shorter than basomedian area; lip free margin arcuate, with well-defined corner; distance between corners 0.8–0.9 × distance between corner and orbit. Width of postocellar area 0.4–0.7 × length. Dorsal length of flagellomere I 1.7–2.2 × apical width. Forefemoral notch larger than average for the genus (Fig. 118c), microscopically setose. Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Venters of tarsomeres V with small spines: a pair of subbasal and one preapical. Sterna III–VII with only a few, sparse setigerous punctures (except sternum III or sterna III and IV densely punctate laterally). Length 7.2–13.0 mm. Volsella and penis valve: Figs. 118d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 119).— Sinai Peninsula, Turkey, and Cyprus, east to Tajikistan, south to Yemen.

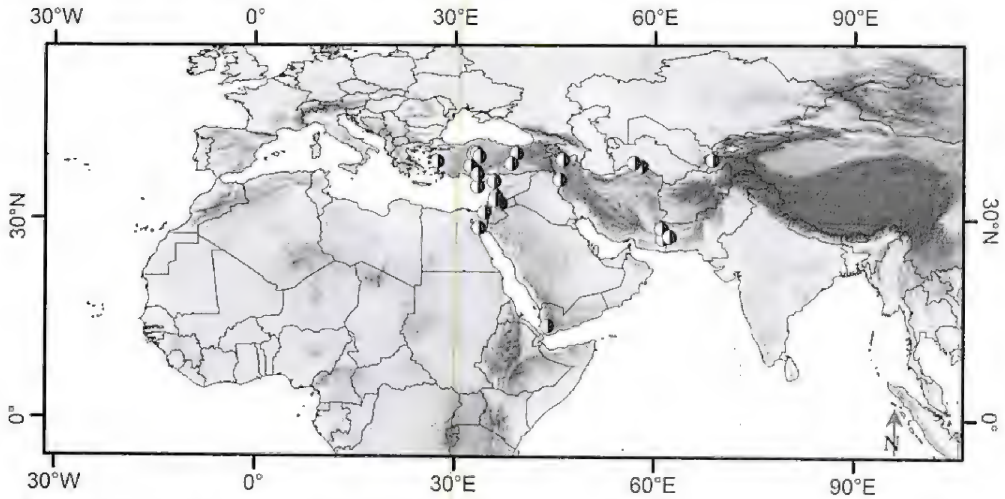

FIGURE 119. Collecting localities of *Tachysphex dignus*.

RECORDS (from Pulawski, 1971, if not indicated otherwise).— **AZERBAIJAN**: Megri on Arax River in Nakhichevan Autonomous Republic. **CYPRUS**: Stavrovani. **EGYPT**: **Sina**: Feiran Oasis (1 ♀). **IRAN**: Hamant-Kuh SE Iranshar, Kuh-i-Taftan, Saravan. **Kurdistan**: 37 km SW Baneh (2 ♂, NHMW). **ISRAEL**: Wadi Ruas. **SYRIA**: Damascus: Amata 50 km SE Suwayda (1 ♂, OÖLM), Kissoue road (3 ♂), Kafr 10 km SE Suwayda (1 ♂, OÖLM), 20 km NE Latakia (6 ♀, 13 ♂, OÖLM), Nawa 30 km from Dara (4 ♂). **TAJIKISTAN**: Kondara Gorge 35 km N Dushanbe (1 ♂). **TURKEY**: **Ağri**: Doğubayazit at 39°33′N 44°0′E (1 ♂, CSE). **Ankara**: Ankara, Beynam, 16 km W Kirikkale (1 ♀). **Erzincan**: Erzincan-Refahiye (1 ♂), Üzümlü (Gayubo, Özbek, and Yildirim, 2003). **Karaman**: Karaman (1 ♂). **Kayseri**: Göreme 54 km W Kayseri at 38°39′N 34°52′E (3 ♂, CSE). **Kirşehir**: Kaman area (2 ♂). **Konya**: Sille (1 ♂). **Malatya**: Kopeksiz 25 km E Malatya (2 ♀, OÖLM). **Manisa**: Muradiye (1 ♂, OÖLM). **Mersin**: Mut (1 ♀). **Label illegible**: 1 ♀. **TURKMENISTAN**: Firuza 40 km W Askhabad (2 ♀, OÖLM), Nuhur in western Kopet-Dagh (Kohl and Handlirsch, 1889). **YEMEN**: Rougrafat in Wadi el Gaber, locality of unknown location (1 ♀, 1 ♂).

Tachysphex dissimulatus Pulawski, sp. nov.

Figures 110, 120.

DERIVATION OF NAME.— *Dissimulatus*, the passive past participle of the Latin verb *dissimulo*, to feign, disguise, hide under false appearance; an allusion to this species similarity to its relatives and to difficulties in its recognition.

RECOGNITION.— *Tachysphex dissimulatus*, a southern African species, has the labrum convex

and protruding beneath the clypeal free margin and the galea longer than wide in profile. Furthermore, the scutal punctures average less than one diameter apart, the propodeal side is uniformly microsculptured, and the setae adjacent to the hypostomal carina are straight and no longer than a midocellar diameter, appressed on the postocellar area and scutum, oriented posterad on the propodeal dorsum apicomesally. The female has an unsculptured apical depression of tergum V, and the male a well-developed foretarsal rake and a microscopically punctate forefemoral notch. A number of other species share these characteristics.

The female of *dissimulatus* has the clypeal lip incised laterally (incision may be abraded in worn specimens), foretibial outer surface all setose, and forecoxa without an apical process. It closely resembles *excavatus* and *incertus*, but *excavatus* ranges from Mauritania to Niger and Togo, and *incertus* in central and southwestern Asia, southern Europe, and in Africa south to southern Sahara. Most *incertus* have the pygidial plate broader than in *dissimulatus*, but I could not find any morphological difference between the females of *dissimulatus* and *excavatus*. Another similar species is *camptopygus* from Namibia, in which, unlike *dissmulatus*, the apex of the pygidial plate is characteristically downcurved.

The male of *dissimulatus* can be essentially recognized by the shape of its volsella, whose dorsal process is either about as high as wide and obliquely truncate apically (but nearly rounded in some specimens) or not differentiated from the apical volsellar portion (Figs. 120c, d). Several species are similar, particularly *panzeri* and *palopterus*, but both occur north of the equator.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea longer than wide in profile, with numerous, minute punctures; its length equal to 0.8 of scape in female,

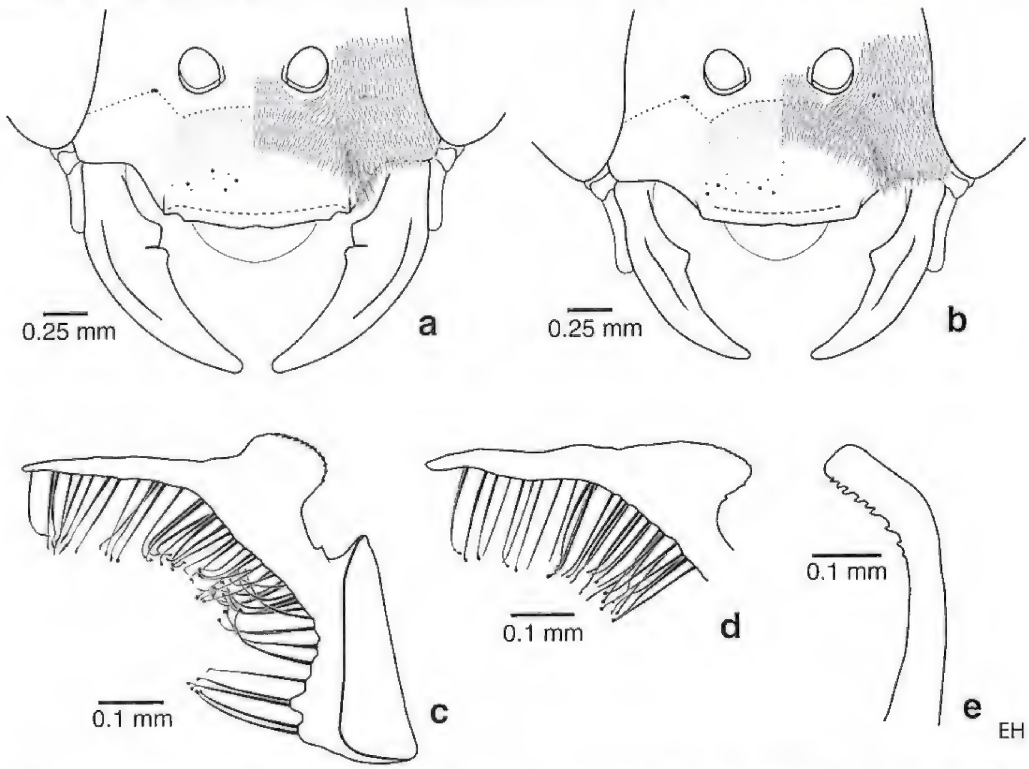

Figure 120. *Tachysphex dissimulatus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – portion of volsella showing individual variation; e – penis valve.

to 0.9 in male. Scutal punctures about one diameter apart, interspaces almost unsculptured in female and some males (hence punctures appearing well defined), microsculptured and dull in most males (hence punctures appearing ill defined). Mesopleuron uniformly microareolate, with microscopic punctures that are several diameters apart. Propodeal dorsum evenly microareolate; side evenly microsculptured, not ridged. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum; shorter than midocellar diameter on each side of oral fossa next to occipital carina; lateral setae of propodeal dorsum oriented posterolaterad, adlateral setae oriented posteromesad and joining apically, admedian setae oriented toward midline in apical half.

Head and thorax black, mandible reddish except basally and apically, clypeal bevel reddish in some females. Frontal setae silvery in female, golden in male. Wing membrane almost hyaline; costal vein of forewing light brown, subcostal vein dark brown. Femora varying from all red to all black in female, in male all black (femoral apex red in some specimens); tibiae varying from all red to largely black (foretibia partly red, midtibia reddish basally and apically, hindtibia all black); tarsi all red or black basally. Gaster red basally and black apically in most females, all red in some; all black in most males, reddish basally in some. Terga I–IV in female, I–III in male, silvery fasciate apically.

♀.— Clypeus (Fig. 120a): bevel as long as basomedian area or slightly longer; lip free margin arcuate, emarginate mesally, incised laterally. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.4–1.8 × apical width. Apicomedian forecoxal process rudimentary. Dorsal foretibial surface with two or three spines; outer surface with one or two spines. Forebasitarsus with seven or eight rake spines. Apical spines of hindtarsomere IV nearly reaching claw bases. Apical depression of tergum V impunctate, glabrous (setose mesally in many specimens). Pygidial plate with minute punctures that average many diameters apart; interspaces unsculptured. Length 8.3–10.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft (cleft ill defined in some specimens). Clypeus (Fig. 120b): bevel about as long as basomedian area, delimited anterolaterally by carina that emerges from lip corner; lip free margin arcuate, with well-defined corner; distance between corners 1.0–1.3 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.7–2.1 × apical width. Forefemoral notch with bottom microscopically punctate and setose. Outer margin of forebasitarsus with 3–5 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Tergum VII, at center, with punctures up to 2–3 diameters apart in some specimens. Apical margin of sternum VIII varying from evenly concave between lateral prongs to obtusely pointed mesally. Length 5.1–10.6 mm. Volsella and penis valve: Figs. 120c-e; dorsal volsellar process in most specimens obliquely truncate, but almost rounded or not differentiated from apical portion in some (two of these three forms may be found in the same specimen).

Floral records.— The males collected in Helmeringhausen and Stampriet areas, Namibia, were collected, respectively, on flowers of *Trianthema parvifolia* E. Mey ex Sond. (Aizoaceae) and of *Limeum* sp. (Moluginaceae), as recorded by F.W. and S.K. Gess, the collectors.

Geographic distribution (Fig. 110).— Zimbabwe, Botswana, Namibia, South Africa.

Records.— Holotype: ♂, **ZIMBABWE**: Kami Ruins, 30 Dec 1995, WJP (CAS). Paratypes: **BOTSWANA**: 1.5 km E Cheleka in Gemsbok National Park, 27 Mar 1990, WJP (1 ♀, 3 ♂); 3 mi NE Maun (1 ♂, BMNH). **NAMIBIA**: **Bethanien District**: 34 km SW Helmeringhausen on road C13, 9 Mar 1999, FSG (1 ♂, AMG). **Gobabis District**: Gobabis, 21 Dec 1974, H. Empey (3 ♀; 2 ♂, AMG). **Karibib District**: 62 km E Karibib, 19 Feb 1990, MS (1 ♀, MS). **Mariental District**: 18 km SE Stampriet on road to Gochas, 29 Mar 2000, FSG (2 ♂, AMG); Vaalbank [Farm] at 23°54′S 18°53′E, 20–22 May 1973, C. Jacot-Guillarmod (1 ♂, AMG). **Okahandja District**: Okahandja, 18 and 19 Feb 1990 (2 ♀); 70 km N Okahandja, 14 Mar 1990, MS

(1 ♂, MS); Waldau River 17 km W Okahandja, WJP, 3–4 Dec 1996 (2 ♂), 14 Dec 1996 (1 ♂). **Omaruru District**: Otjikoko Sud Farm 33 km ENE Omaruru, 10–13 Feb 1972, [British Museum] Southern African Expedition (1 ♀, BMNH). **Otjiwarongo District**: Osire, 24 Dec 1974, H. Empey (1 ♀, AMG). **Rehoboth District**: 7 km N Rehoboth, 15 Feb 1990, MS (1 ♀, MS); 9 km S Rehoboth, 14 Feb 1990, MS (1 ♂, MS); 23 km N Rehoboth, 15 Feb 1990, MS (1 ♀, MS) and WJP (1 ♀, 1 ♂), 17 Feb 1990, MS (1 ♀, MS) and WJP (1 ♂); 49 km S Rehoboth, 9 Feb 1990, MS (1 ♀, MS). **Windhoek District**: Gamsberg east of Pass, 12 Mar 1999, FSG (1 ♂, AMG). **SOUTH AFRICA**: **Eastern Cape Province**: Bathurst, 14 Jan 1959, C. Jacot-Guillarmod (1 ♂, AMG), Kenton-on-Sea, 23–30 Nov 1971, R.A. Jubb (1 ♂, AMG). **Gauteng**: Bronkhorstbaai, 10 Oct 1964, H. Empey (1 ♀, AMG); Bronkhorst: Spruit Dam, 10 Oct 1964, H. Empey (1 ♀); Tswaing (as Soutpan), 31 Dec 1985, J.M. Carpenter (1 ♀). **Kwazulu Natal**: Sileza Forest Reserve, 4 Nov 1996, M.E. Irwin (1 ♀, CSE). **Mpumalanga**: Waterval Boven, 10–11 Feb 2000, Marek Halada (1 ♂, OÖLM). **Northern Cape Province**: Nossob in Kalahari Gemsbok National Park, 27 Mar 1990, MS (1 ♀, 1 ♂, MS) and WJP (1 ♂), Olifantshoek, 26 Nov 1990, R. Miller and L. Stange (1 ♀, FSCA). **Northern Province**: Buffelspoort Dam, 16 Nov 1968, H. Empey (1 ♂, AMG); Ellisras, 24 Dec 1973, H. Empey (1 ♀, AMG). **North West Province**: Marico, 10 Dec 1924, WKR (1 ♀, AMG). **Western Cape Province**: 60 km N Cape Town, 9 Nov 1999, M. Halada (2 ♂, OÖLM); Cederberg Mts. 15–30 km SE Clanwilliam, 24 Oct 1982, T.L. & R.T. Griswold (4 ♂, USU); Ceres, R.E. Turner, Dec 1920 (3 ♀, BMNH) and Dec 1924 (1 ♀, BMNH); 20 km N Citrusdal, 27 Oct 1999, M. Halada (1 ♀, 2 ♂, OÖLM); 13 mi S Clanwilliam, 2 Nov 1966, J.G. Rozen (1 ♀, 1 ♂, AMNH); Kliprand 60 km S Loeriesfontein, 31 Oct 1999, Marek Halada (5 ♂, OÖLM); 40 km S Lambert's Bay, 30 Oct 1999, M. Halada (3 ♂; 2 ♀, 6 ♂, OÖLM); Matjiesfontein, 14–27 Nov 1928, R.E. Turner (1 ♀, BMNH); Pakhuis Pass, 24 Oct 1983, T.L. & R.T. Griswold (1 ♂, USU); Paleisheuwel, Nov 1948, [South African] Mus. Exped. (1 ♀, SAM); Wellington: Rooshoek, P.M.F. Verhoeff, 17–30 Nov 1973 (1 ♂; 4 ♀, 2 ♂, RMNH) and Dec 1973 (2 ♀, 1 ♂; 3 ♀, 4 ♂, RMNH). **ZIMBABWE**: same data as holotype (11 ♀, 38 ♂); Matobo, 8 Dec 1990, R. Miller and L. Stange (2 ♀, FSCA); Redbank at Kami River, WJP, 30 Jan 1995 (1 ♂), 28 Dec 1995 (1 ♀), 1 Jan 1996 (1 ♀, 1 ♂); Sawmills at Umguza River, 27 Jan 1995, WJP (1 ♀).

Tachysphex diversilabris Arnold

Figures 112, 121, 122.

Tachysphex diversilabris Arnold, 1960:83, ♀, ♂. Lectotype: ♂, South Africa: Kwazulu-Natal: Drakensberg Mts.: Fire Lookout in Cathedral Peak Forestry Reserve (SAN), **here designated**, examined.— Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex diversilabris*, an all black species of South Africa's colder habitats, has scutal and mesopleural punctures well defined, labrum flat and galea shorter than wide in profile, hindwing crossvein cu-a vertical, and tarsi unspecialized (length of midtarsomere II more than twice width, length of hindtarsomere IV greater than width, apical tarsomeres without spines on venter or lateral margins).

The female differs from other such species except *congoensis*, *consocius*, and some *aterrimus* in having a laterally incised clypeal lip (Fig. 121a) and a convex middle clypeal section, with a well-defined bevel (clypeus almost flat in *aterrimus*, with an ill-defined bevel). Unlike *congoensis* and *consocius*, it has the apical depression of tergum V minutely punctate and finely setose (rather than unsculptured and asetose). In addition, in many specimens the setae of its postocellar area are about 2.0–3.0 midocellar diameters long (rather than 1.0–1.5 ×) and scutal and mesopleural setae are sinuous rather than straight. Coloration is also somewhat helpful: the mandible of *diversilabris* varies from all black to black with a reddish preapical zone (tooth of trimmal carina and adjacent area are black in all specimens examined), and the pygidial plate is black. In most *consocius*, the mandible is largely reddish mesally, and the pygidial plate, in many specimens, is reddish apically.

The male can be recognized by a unique combination of its sharply pointed clypeal lobe, not angulate laterally (Fig. 121b) and flagellomeres III–X each with a longitudinal sulcus that separates two differently setose areas (Fig. 121c), although the sulcus is rudimentary is some specimens.

Subsidiary recognition features include: trimmal carina obtusely angulate but without real tooth (Fig. 121b); scutum anteriorly and mesopleuron anteriorly, in most specimens, with sinuous setae; and sternum VIII tridentate apically (but middle tooth evanescent in some specimens). The unusual flagellar structure is shared with most *consocius*, in which, however, the trimmal carina has a tooth, the clypeal lip is angulate laterally (not sharply pointed mesally), and the scutal and mesopleural setae are straight or angled distally.

Tachysphex diversilabris and *consocius* differ sharply in their geographic ranges. The former is known only from higher elevations of eastern and western South Africa and also from the Table Mountain area near Cape Town, whereas *consocius* is found throughout Africa, in southern Europe, and in Asia east to Sri Lanka. Both were collected simultaneously at Constantiaberge near Cape Town at the elevation of 640 m, and also at Dassiefontein Farm in Northern Cape Province.

Relations to *Tachysphex consocius*.— Except for the male clypeus, *diversilabris* and *consocius* closely resemble each other morphologically, and share a uniquely derived male antennae. The laterally incised female clypeal lip and tridentate male sternum VIII, although found elsewhere within the genus, are unique specializations among their closest relatives. These two *Tachysphex*, therefore, appear to be sister species.

Description.— Mandible: outer ridge somewhat swollen and expanded over notch. Scutal punctures well defined, somewhat coarse, averaging less than one diameter apart (some punctures almost confluent). Mesopleural punctures well defined, averaging no more than one diameter apart; interspaces conspicuously microsculptured in most specimens, but unsculptured in one male from Table Mountain, South Africa. Propodeal dorsum irregularly ridged to irregularly rugose; side ridged. Hindcoxal dorsum with inner margin carinate.

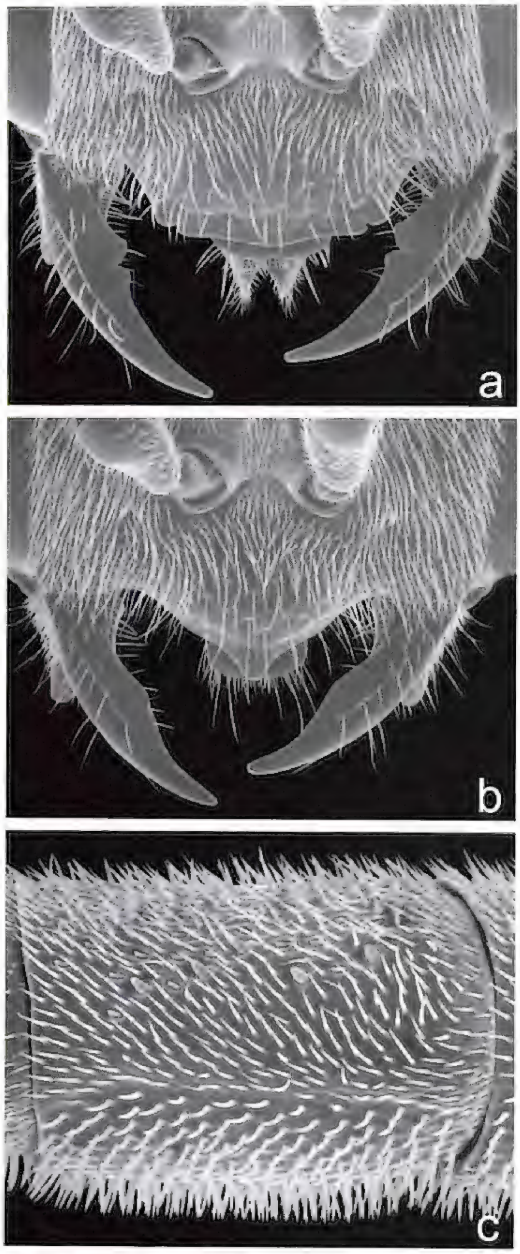

Figure 121. *Tachysphex diversilabris* Arnold: a – female clypeus and mandible (×44); b – male clypeus and mandible (×55); c – male flagellomere IV showing longitudinal groove (×282).

Setae erect on postocellar area, scutum, and midfemoral venter, sinuous on scutum anteriorly and on mesopleuron in most specimens, but straight in two males from Van Reenen and in single

female from 10 km W Utrecht; either erect or diverging anterolaterad from midline on propodeal dorsum; setal length expressed as a fraction of basal mandibular width: 0.4 on each side of oral fossa next to occipital carina, 0.6 on postocellar area (0.4 in female from 10 km W Utrecht).

Head and thorax black, mandible all black or reddish preapically, largely reddish mesally and preapically in one male examined. Frontal setae silvery in both sexes. Wing membrane hyaline to slightly infumate; costal and subcostal veins of forewing black. Legs and gaster black. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 121a): bevel longer than basomedian area, with sparse, large punctures; lip free margin arcuate or slightly pointed mesally, incised laterally. Width of postocellar area 1.8 × length. Dorsal length of flagellomere I 1.9–2.0 × apical width. Dorsal foretibial surface with a few fine bristles; outer surface with one spine near midlength or without spines. Forebasitarsus with five or six rake spines. Apical depression of tergum V microsculptured and setose throughout. Pygidial plate microsculptured, with punctures that average several to many diameters apart (markedly less than that near margin). Length 7.5–8.8 mm.

♂.— Mandible: trimmal carina obtusely angulate but without real tooth and without cleft. Clypeus (Fig. 121b): bevel about as long as basomedian area; lip free margin pointed (point acute to rectangular), without corner, thus forming single curved line with rest of clypeal margin. Width of postocellar area 2.0–2.3 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width; flagellomeres III–X each with longitudinal sulcus that separates two differently setose areas (Fig. 121c), but sulcus rudimentary in one of the two males from 5 km S Clanwilliam. Femoral notch with microscopic, inconspicuous setae. Outer margin of forebasitarsus mostly without preapical spines, but with two or three such spines in specimens from Cape Town area; outer apical spine of foretarsomere II shorter than tarsomere III (only slightly so in specimens from Cape Town area). Sternum VIII tridentate apically in most specimens, but middle tooth evanescent in single specimen from Entabeni Forest Reserve and absent in two males from 5 km S Clanwilliam. Length 5.6–7.8 mm. Volsella and penis valve: Fig. 122.

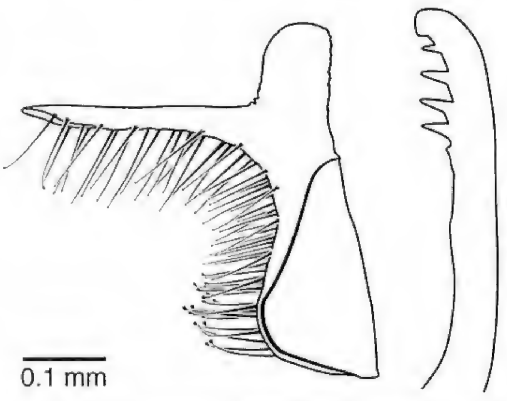

FIGURE 122. *Tachysphex diversilabris* Arnold: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 112).— South Africa: Drakensberg Mountains, Table Mountain area near Cape Town, and Kamiesberg Mountains.

RECORDS.— **SOUTH AFRICA**: **Kwazulu-Natal**: Cathedral Peak (3 ♂, USU), Cathedral Peak area in the Drakensberg Mts.: above Mike's Pass at 28°59′S 29°14′E, 1973 m (1 ♂; 2 ♀, PPRI), Cathedral Peak: Fire Lookout at 7500–7700 ft. [= 2290–2350 m] (1 ♀, 1 ♂, SAM, lectotype and paralectotype of *diversilabris*), Coleford Nature Reserve at 29°57′S 29°27′E (1 ♂, PPRI), Giant's Castle Nature Reserve (1 ♀, CSE; 1 ♀, ZMAN), Drakensberg Garden area (1 ♀, PPRI), near Hlatikulu (1 ♂, ZMAN), 10 km W Utrecht (1 ♀, OÖLM), Van Reenen (2 ♂, BMNH). **Northern Cape Province**: Dassiefontein Farm 14 road km E Kamiesksroon (5 ♀, 1 ♂). **Northern Province**: Entabeni Forest Reserve at 23°00′S 30°16′E (1 ♂, PPRI), Mogoto Nature Reserve near Zebediela (1 ♂, PPRI). **Western Cape Province**: Cape Peninsula: Silver Mine (1 ♀, AMG), Cape Town: Constantiaberge, 640 m alt., at 34°02′S 18°23′E (1 ♀, SAM) and Constantiaberge above Tokai Forest and Donkerbooskloof, 460 m alt., same coordinates (2 ♀, 2 ♂, SAM), Cape Town: Table Mountain (1 ♀, 1 ♂, ZMLU) and Table Mountain near top at 33°57′S 18°24′E (14 ♀, 7 ♂), 5 km S Clanwilliam at 32°11.4′S 18°52.5′E (1 ♀, 2 ♂).

***Tachysphex dolosus* Arnold**
Figures 123–125.

Tachysphex panzeri var. *dolosus* Arnold, 1923:171, ♀, ♂. Lectotype: ♀, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex panzeri dolosus*: Bohart and Menke, 1976:275 (new status, listed).— As *Tachysphex dolosus*: Pretorius, 2005:116 (new status, use of geometric morphometrics to determine sexual dimorphism in wing venation).

Recognition.— *Tachysphex dolosus* has a convex labrum (markedly protruding beyond the clypeal free margin), galea about as long as the scape, and the propodeal side microareolate (all or largely so), glabrous adjacent to the metapleural sulcus. It differs from all other such species except *socotrae* in having all setae of the propodeal dorsum (except lateral ones) suberect and pointing anterad or anterolaterad (Fig. 124a), although setal orientation is often altered due to specimens old age, mechanical handling, or moisture. Subsidiary recognition features are: terga I–IV each with an apical, silvery fascia (the fascia is interrupted mesally on tergum IV), and male midfemur with obtuse edge between venter and posterior surface (Fig. 123d).

In the female, the apical depression of tergum V is impunctate and asetose, as in *caliban, camptopygus, excavatus, incertus*, and *sycorax* (specimens with altered propodeal setae may be confused with these species). Unlike *socotrae* (an endemic of Socotra Island), the female of *dolosus* has a densely punctate scutum (punctures about one diameter apart). In the female of *socotrae*, punctures of the scutal disk average several diameters apart.

The male is similar to *calidus*, and the most reliable recognition feature is the shape of the volsella whose dorsal process is low, broad, while elongate, narrow in *calidus* (compare Figs. 78b and 124b). Another good recognition feature is the surface of the forefemoral notch, whose bottom is densely, microscopically punctate and setose (Figs. 123f, g), appearing dull under lower magnifications. In *calidus*, the femoral notch is microscopically, sparsely punctate and setose, appearing shiny. In addition, the propodeal dorsum of *calidus* has a varying but constantly different setal pattern (in many specimens most setae are oriented anterad, but preapical setae diverge radially from a pair of vortices). Unlike *socotrae*, the corner of the clypeal lip is not prominent (prominent in *socotrae*).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea: length equal to 1.0–1.1 of scape (see below for punctation). Scutal punctures: see Variation below. Mesopleuron dull, uniformly microareolate. Propodeal dorsum uniformly microareolate, side uniformly microareolate or ridged posteroventrally. Hindcoxal dorsum with inner margin not carinate. Outer surface of foretibia and midtibial dorsum narrowly impunctate and glabrous in most females (but punctate and setose throughout in some, e.g., in the two females from Kenya) and in many males.

Setae subappressed to suberect on postocellar area; appressed on scutum; suberect but varying in shape and length next to hypostomal area (see Variation below); suberect, oriented anterad or anterolaterad on propodeal dorsum except lateral setae oriented posterolaterad (Fig. 124a).

Head and thorax black, mandible reddish yellow (except apically); in most specimens also the following reddish yellow: clypeal bevel and lip, labrum, and pronotal lobe posteriorly. Frontal setae silvery in female, golden in male. Wing membrane almost hyaline to slightly infumate; in forewing both costal and subcostal veins yellowish brown. Legs and gaster all red in most specimens, but femora black in a male from Mossel Bay, and gaster all or largely black in some specimens (e.g., those from 62 km SW Morogoro, Tanzania). Terga I–IV silvery fasciate apically (tergum IV only laterally so).

♀.— Clypeus (Fig. 123a): bevel about as long as basomedian area; lip free margin arcuate,

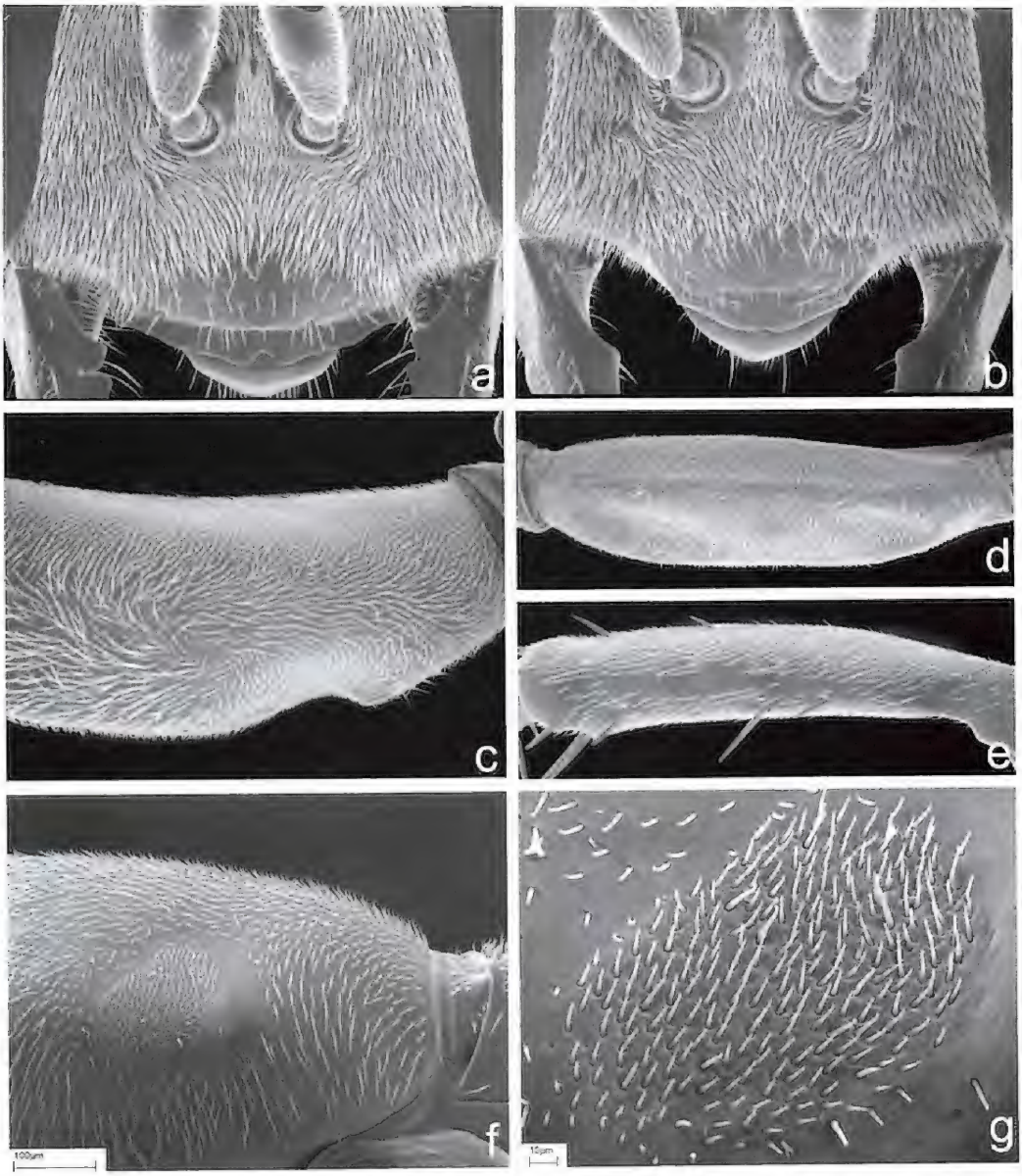

FIGURE 123. *Tachysphex dolosus* Arnold: a – female clypeus (×37); b – male clypeus (×44); c – base of male forefemur in profile (×42); d – male midfemur in ventral view (×43); e – female foretibia, outer surface (×42); f – base of male forefemur in ventral view showing bottom of notch; g – bottom of forefemoral notch, higher magnification.

emarginate mesally, sinuous or not sinuous laterally. Width of postocellar area 0.5–0.7 × length. Dorsal length of flagellomere I 2.5–2.6 × apical width. Dorsal foretibial surface with three spines; outer surface with two or three spines and longitudinal, glabrous zone (Fig. 123e). Forebasitarsus with seven or eight rake spines; outer apical spine of hindtarsomere V reaching claw base. Apical depression of tergum V impunctate, asetose. Pygidial plate with well-defined punctures that aver-

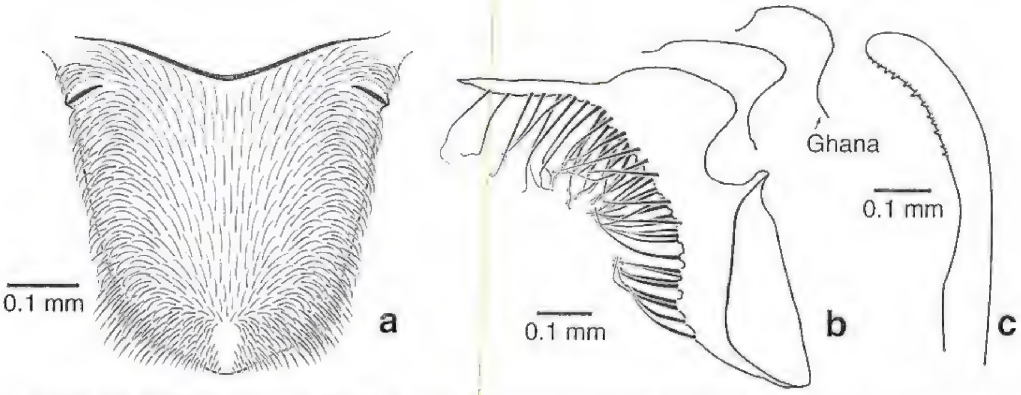

FIGURE 124. *Tachysphex dolosus* Arnold: a – propodeal dorsum showing orientation of setae; b – volsella; c – penis valve.

age many diameters apart (but many lateral punctures less than one diameter apart). Length 11.0–16.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 123b): bevel about as long as basomedian area; lip free margin straight, rounded, or obtusely pointed, entire or emarginate; corner well defined to inconspicuous; distance between corners varying geographically (see Variation below). Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 2.6 × apical width. Forefemoral notch densely, microscopically punctate and setose, appearing dull under lower magnifications (Figs. 123c, f, g). Midfemur with obtuse edge between venter and posterior surface (Fig. 123d). Outer margin of forebasitarsus with 3–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in many specimens. Length 7.5–12.0 mm. Volsella and penis valve: Figs. 124b, c.

GEOGRAPHIC VARIATION.— Specimens from various areas differ in punctation, pilosity of lower gena, and the shape of the male clypeus, as described below:

Galea: punctures about one diameter apart (except anteriorly) in specimens from southern Africa, Tanzania and Kenya, and several diameters apart in West African males.

Genal setae (on each side of oral fossa next to occipital carina): slightly sinuous in most southern African specimens, but nearly straight in a male from Dasklippas in Cederberg Mts., South Africa, and straight in the single female from Angola and the specimens from Tanzania, Kenya, Ghana and Togo. Setal length is about 0.3 × basal mandibular width in southern African specimens and those from 73 km NW Korogwe, Tanzania, and about 0.4 × basal mandibular width in the Western African and Kenyan specimens as well as those from 62 km NW Morogoro, Tanzania.

Scutal punctures: averaging about one diameter apart in female, about 2–3 diameters apart on disk in males from southern Africa, Kenya, and Tanzania, about one diameter apart in males from West Africa.

Male clypeus: distance between lip corners 0.8–1.0 × distance between corner and orbit in southern African populations, 1.1–1.3 × in males from Kenya and Tanzania, and 1.6–1.8 × in males from Ghana and Togo.

Male tergum VII: punctures about one diameter apart in specimens from southern Africa, Tanzania, and Kenya, but averaging several diameters apart in West African males.

Volsella: dorsal process low in southern African and Kenyan males, but roundly prominent in those from Ghana and Togo.

FLORAL RECORDS AND PREY.— Specimens from 120 km W Khorixas and those from 97 km

from Swakopmund (AMG) were collected on flowers of *Zygophyllum simplex* L. (Zygophyllaceae), those from Omaruru to Usakos on flowers of *Brownanthus kuntzei* (Schinz) Ihlenf. and Bittrich (Aizoaceae) and of *Limeum argute-carinatum* Wawra and Peyr. (Molluginaceae), as recorded by F.W. and S. Gess, the collectors. One female from Tierberg Farm, South Africa (AMG), is pinned with prey, an acridid nymph (det. F.W. Gess).

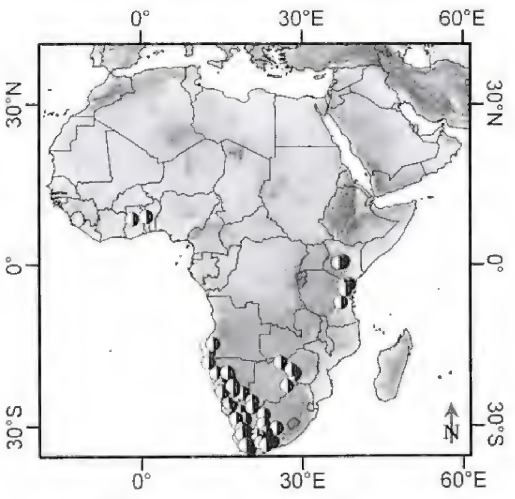

FIGURE 125. Collecting localities of *Tachysphex dolosus*.

GEOGRAPHIC DISTRIBUTION (Fig. 125).— Ghana and Togo, Kenya and Tanzania to Angola and South Africa.

RECORDS.— **ANGOLA**: Giraul River 10 mi NE Namibe (3 ♂, BMNH), Pediva 30 mi E Porto Alexandre (2 ♂, BMNH), 5 mi E Villa Arriaga (1 ♀). **BOTSWANA**: Palapye road (1 ♂, AMNH). **GHANA**: Kawampe 45 km N Kintampo at 8°30′N 1°35′W (1 ♂). **KENYA**: **Coast Province**: Taita Discovery Centre (1 ♀, 10 ♂), Taita Discovery Centre: Galla Hill area (1 ♀, 16 ♂). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♂), 5 km NNE Isiolo (1 ♀, 2 ♂). **Rift Valley Province**: Mpala Research Station (1 ♂, LACM). **NAMIBIA**: **Karasburg District**: Blinkoog near Warmbad in Great Karas Mts. (1 ♂, SAM), SE 2719 Ca [= between 27°45′ and 28°00′S and 19°15′ and 19°30′E] (2 ♀, 1 ♂, NMN); 12 km SW Grünau (1 ♀, FSCA), 30 km E Karasburg (2 ♂, AMG), Ortmansbaum near Warmbad (1 ♀, NMN). **Karibib District**: Khan River 23 km N Karibib (1 ♀, 13 ♂; 2 ♂, NMN), Phillips Ranch 5 mi N Usakos (1 ♀), 97 km from Swakompund on road to Usakos (2 ♂, AMG), 55 km SW Usakos (1 ♂), 65 km SW Usakos (1 ♀, MS). **Keetmanshoop District**: Noachabeb [Farm] 27 mi NNE Grünau (1 ♂, BMNH; 1 ♀, NMN). **Khorixas District**: Brandberg West 70 km WNW Uis Myn (1 ♂, OHL), W Grootberg Pass (2 ♀, 1 ♂, AMG), 4 km E Khorixas (1 ♂), 2 km W Khorixas at 20°23′S 14°56′E (2 ♂), 120 km from Khorixas on road to Palm at 20°17′S 14°05′E (1 ♀, 8 ♂, AMG). **Lüderitz District**: Aus (1 ♂, BMNH), near Aus on road to Helmeringhausen (1 ♂, AMG), Namib Farm 70 km N Aus (1 ♂, OHL). **Maltahöhe District**: 30 road km from Helmeringhausen (1 ♀, AMG), Naukluft (1 ♂, BMNH). **Mariental District**: Onze Rust 192 [Farm] (1 ♂, AMG), Vaalbank 319 [Farm] (1 ♂, AMG). **Okahandja District**: Waldau River 17 km W Okahandja (2 ♀, 1 ♂). **Omaruru District**: 32 km W Omaruru (1 ♂, AMG), Omaruru to Usakos at 21°41′S 15°59′E (10 ♂, AMG), Otjikoko-Süd [Farm] (1 ♂, NMN). **Opuwo District**: Anabib (Orupembo) 100 mi W Ohopoho (1 ♂, ZMLU). **Otjiwarongo District**: 18 km NE Kalkfeld (1 ♂). **Outjo District**: Namatubis Guest Farm 15 km NW Outjo (2 ♀, CSE). **Rehoboth District**: 9 km S Rehoboth (1 ♂). **Swakopmund District**: Ganab (1 ♂, PPRI), Gobabeb (1 ♀, 1 ♂, ZMUC), *Welwitschia* forest near Gobabeb (1 ♂), Homeb ESE Gobabeb (3 ♂, FSCA), Mirabib 40 km ENE Gobabeb (3 ♂, ZMUC), Swakop River 10 km E Swakopmund (1 ♂), 63 km NE Swakopmund (1 ♀, 7 ♂), 88 mi E Walvis Bay (2 ♂). **Windhoek District**: Djab (1 ♀, 1 ♂, NMN), Windhoek (2 ♀, NMN). **SOUTH AFRICA**: **Eastern Cape Province**: Klipplaat (1 ♂, TMP), Rietbron (1 ♀, AMG), Willowmore (3 ♀, 1 ♂, AMG; 4 ♀, 13 ♂, TMP). **Free State**: 30 km N Colesberg at Orange River (1 ♀, 1 ♂, OÖLM). **Northern Cape Province**: Aggeneys (12 ♂, FSCA), Bloukrans near Calvinia (1 ♀, 3 ♂, BMNH), Calvinia (1 ♀, SAM), Carnarvon (1 ♂, AMG), Concordia (1 ♂, FSCA), Fraserburg (1 ♀, SAM), Nossob in Kalahari Gemsbok National Park at 25°30′S 20°37′E (12 ♀, 11 ♂, PPRI), Olifantshoek (1 ♂, FSCA), Onseepkans (3 ♂ SAM), Prieska (1 ♀, AMG), Tanqua-Karoo National Park (1 ♀, SAM), Twee Rivieren in Kalahari Gemsbok National Park at 26°28′S 20°37′E (4 ♀, 4 ♂, PPRI), Victoria West (20 ♀, 9 ♂, AMG), Vioolsdrif (1 ♀, AMG). **Western Cape Province**: Beaufort West (8 ♂, SAM), Cape Agulhas (1 ♂, ZMLU), Ceres (1 ♂, SAM), 43 km ENE Ceres on road to Sutherland (2 ♂, AMG), 40 km E Clanwilliam: Sevilla (1 ♂, USU), Dasklippas in Cederberg Mts. NE Porterville (1 ♂, OHL), Dikbome Farm near Merweville (5 ♀, 32 ♂, SAM), George (1 ♂, TMP), Graafwater (1 ♂, FSCA), Karoo National Park at 32°15′S 22°32′E (1 ♀, 1 ♂, PPRI) and 32°20′S 22°30′E (2 ♂, PPRI), Kliprand 60 km WNW Loeriesfontein

(1 ♀, 2 ♂, OÖLM), Laingsburg (1 ♀, AMG), 30 km ENE Laingsburg at 33°08′S 21°08′E (1 ♂), 5 km S Lambert's Bay (2 ♂, OÖLM), Matjiesfontein (3 ♂ BMNH), Merweville (3 ♀, 6 ♂, SAM), Montaigu to Matroosberg at ca 33°32′S 19°52′E (1 ♂, AMG), Pearly Beach (1 ♂, SAM), 5 km W Robertson (1 ♂), Tierberg (3 ♂; 3 ♀, AMG), Uniondale (1 ♂, PPRI), Vanrhynsdorp (1 ♀, OÖLM), Wellington: Rooshock (1 ♀, 1 ♂, RMNH), Worcester (1 ♂, TMP). **TANZANIA**: **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya (2 ♀, SAM). **Morogoro Region**: 62 road km SW Morogoro (1 ♀, 10 ♂). **Tanga Region**: 73 km NW Korogwe (5 ♀, 30 ♂; 2 ♂, MCZ; 1 ♀, 4 ♂, UDS). **TOGO**: 5 km W Sokodé (1 ♂). **ZAMBIA**: **Eastern Province:** Upper Luangwa River (1 ♂, BMNH). **ZIMBABWE**: Bulawayo (1 ♂, AMG; 1 ♂, NRS, labeled *sycorax* by G. Arnold; 4 ♀, 9 ♂, SAM, including 1 ♂ labeled *sycorax* by G. Arnold; 1 ♀, 5 ♂, TMP), Bulawayo: Hillside (1 ♂, AMG; 2 ♀, SAM), Chewunde (1 ♂, BMNH), Filabusi: Druid Mine (4 ♂, SAM; 1 ♂, TMP), Hwange (1 ♂, AMG), Matetsi in Hwange District (1 ♂, AMG; 1 ♀, SAM), Matobo (1 ♂, SAM), Sawmills (3 ♀, 1 ♂, including lectotype ♀ and paralectotype ♂ of *dolosus*, SAM). **LOCALITY ILLEGIBLE**: 2 ♀ (SAM, 1 ♀ labeled *sycorax* by G. Arnold).

Tachysphex ebeninus Arnold

Figures 126, 127.

Tachysphex ebeninus Arnold, 1929c:385, ♀,♂. Lectotype: ♂, Zimbabwe: Redbank (SAM), **here designated,** examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex ebeninus* has the gaster and femora black (also the female tibiae), labrum flat and galea shorter than wide in lateral view, hindwing crossvein cu-a vertical, and unspecialized tarsi (midtarsomere II more than twice as long as wide apically, tarsomeres IV longer than wide apically, apical tarsomeres without spines on venter or lateral margins). In addition, the mesopleuron has well-defined punctures and unsculptured, shiny interspaces; the propodeal side has well-defined ridges; the setae are erect on the postocellar area (Figs. 126a, b), suberect to erect on the scutum, and inclined obliquely posterad on the propodeal dorsum. The clypeal lip, in the female, is arcuate, obtusely incised laterally (Fig. 126c), and in the male unusually narrow: the lip width is markedly less than the distance between the lip and eye orbit (Fig. 126d). Subsidiary recognition features are: terga I–IV with silvery, apical fasciae that are inconspicuous and broadly interrupted mesally in most specimens; male tibiae at least partly red, foretarsus with well-developed rake, and outer apical spine of foretarsomere II markedly longer than tarsomere III.

Tachysphex ebeninus closely resembles *crassipes*, and I have found no reliable characters to separate the females. The most obvious difference is in the propodeal dorsum, regularly ridged longitudinally in *ebeninus*, but irregularly ridged or rugose in *crassipes*. An aberrant male of *ebeninus*, however, has the propodeal dorsum finely rugose, and females with a similar sculpture can certainly be expected. Another difference is in the mesopleuron sculpture: in all *ebeninus* examined, the interspaces are unsculptured, shiny, whereas in *crassipes*, the interspaces vary from unsculptured to microsculptured. The male of *ebeninus* differs in having the tibiae red (all or largely so) and the clypeal and frontal setae golden (in the male of *crassipes* the tibiae are all black and the head vestiture is all silvery).

Relationships to *Tachysphex crassipes*.— *Tachysphex ebeninus* may be just a local or geographic form of *crassipes* (and eventually of *punctatiformis*), hence a junior synonym. My limited material does not allow me to test this possibility.

Description (see also Variation below).— Scutal and mesopleural punctures well defined, averaging about 2–3 diameters apart on scutal disk and beneath mesopleural scrobe; interspaces unsculptured, shiny. Propodeal dorsum regularly ridged longitudinally, side ridged. Hindcoxal dorsum with inner margin carinate basally.

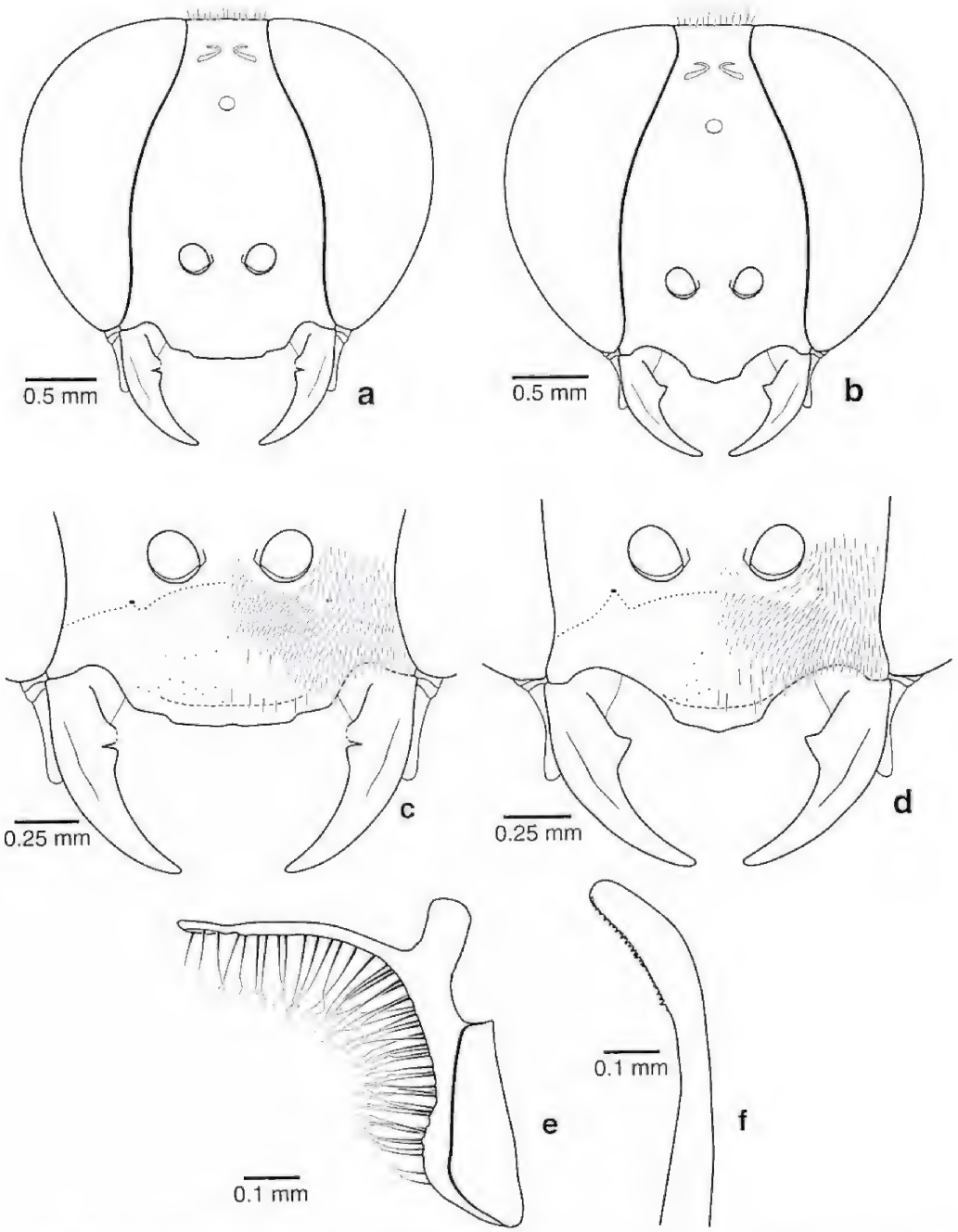

FIGURE 126. *Tachysphex ebeninus* Arnold: a – female head; b – male head; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

Setae sinuous and erect on postocellar area (Figs. 126a, b), on each side of oral fossa next to occipital carina, and on scutum (setal length up to 0.5 × basal mandibular width); sinuous, oriented posterad on propodeal dorsum; erect, about one midocellar diameter long, on midfemoral venter.

Head, thorax, gaster, and femora black, mandible dark reddish preapically. Wing membrane slightly yellowish, costal and subcostal veins of forewing brown. Tibiae and tarsi black in female (tarsal apex red), all or partly red in male (fore- and midtibiae largely brown reddish in one specimen). Frontal and clypeal setae silvery in female, golden in male. Terga I–IV each with broadly interrupted, inconspicuous silvery fascia, but fasciae well developed in single male from Victoria Falls.

♀.— Clypeus (Fig. 126c): bevel shorter than basomedian area; lip free margin arcuate, incised laterally. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.0 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two spines. Forebasitarsus with six rake spines. Outer margin of foretarsomere IV about 0.5 length of inner margin. Apical depression of tergum V impunctate, glabrous. Pygidial plate: punctures many diameters apart mesally, denser near margin; some of the punctures adjacent to margins elongate. Length 8.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 126d): bevel slightly to markedly shorter than basomedian area; lip free margin arcuate, with rounded but well-defined corner; distance between corners 0.6–0.7 × distance between corner and orbit. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.6–1.9 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sternal punctures conspicuous, increasing in size toward gastral apex; apical depressions impunctate. Sternum VIII evenly emarginate or with rudimentary apicomedian projection. Length 7.6–9.0 mm. Volsella and penis valve: Figs. 126e, f.

Variation.— The single male from Victoria Falls differs from the other specimens in having denser scutal and mesopleural punctures, finer propodeal sculpture, and shorter, straight setae. In particular, most scutal punctures, on the disk, are about one diameter apart (some are about three diameters apart), and the mesopleural punctures are about one diameter apart beneath the scrobe. The propodeal dorsum is finely rugose, with tendency to form longitudinal ridges. The setae are erect on the postocellar area but only about 0.25 × basal mandibular width, markedly inclined adjacent to the hypostomal carina (length about 0.4 × basal mandibular width), and inclined on the scutum. Silvery, apical fasciae are well defined on terga I–V.

Collecting period.— 15 May through 20 August.

Geographic distribution (Fig. 127).— Zimbabwe.

Records.— **ZIMBABWE**: Bulawayo airport (5 ♂), De Beer's Farm at Umguza River (1 ♂, SAM, paratype of *ebeninus*), Nyamandhlovu (1 ♂, SAM, paratype of *ebeninus*), Redbank at Kami River (1 ♀, 3 ♂, SAM, including lectotype of *ebeninus*), Victoria Falls (1 ♂).

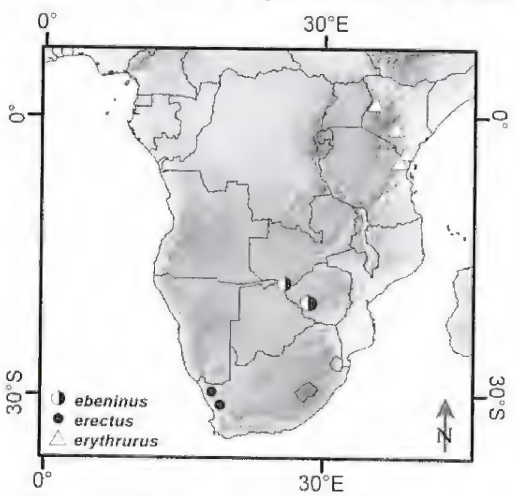

Figure 127. Collecting localities of *Tachysphex ebeninus*, *erectus*, and *erythrurus*.

***Tachysphex erectus* Pulawski, sp. nov.**
Figures 127, 128.

Derivation of name.— *Erectus*, Latin for erect; with reference to the erect setae on tergum I, one of this species main diagnostic features.

Recognition.— The male of *erectus*, an endemic of the Namaqualand region of South Africa, has a black body, flat labrum, vertical hindwing vein cu-a, coarsely punctate scutum and mesopleuron (interspaces shiny), and tergum I with erect setae. These characters are unlikely to be sexually dimorphic and will probably allow recognition of the unknown female. The male is additionally characterized by an unusually narrow clypeal lip, with corners conspicuously closer to each other than to the respective orbit (Fig. 128a), free margin of clypeal lip straight, foretarsus without rake, and tergum VIII tridentate apically.

Description (male only).— Galea minutely, sparsely punctate, longer than wide, as long as 0.8 of scape. Scutal and mesopleural punctures well defined, coarse, mostly less than one diameter apart (some punctures 1–2 diameters apart); interspaces shiny. Propodeal dorsum rugose; side either all ridged or coarsely punctate except impunctate anteriorly; posterior surface coarsely punctate, with a few transverse ridges ventrally. Hindcoxal dorsum with inner margin carinate basally, carina somewhat expanded basally. Tergum II with lateral line (laterotergite present).

Setae suberect on each side of oral fossa next to occipital carina; erect on postocellar area and scutum; oriented obliquely anterad on propodeal dorsum; erect on tergum I. Setal length, next to occipital carina, on postocellar area, and on tergum I, about 0.4 × basal mandibular width; longest midfemoral setae about equal to midocellar diameter.

Head, thorax, legs, and gaster black, but mandible reddish mesally and tarsal apex brown. Frontal setae silvery. Wing membrane slightly infumate; costal and subcostal veins of forewing brown. Terga I and II or I–III silvery fasciate apically.

♀.— Unknown.

♂.— Mandible: trimmal carina with prominent, asymmetrical tooth, with cleft, markedly emarginate distad of tooth (Fig. 128a). Clypeus (Fig. 128a): bevel about as long as basomedian area; lip free margin straight, with well-defined corner; distance between corners unusually small, 0.5 × distance between corner and orbit. Width of postocellar area 1.9–2.0 × length. Dorsal length of flagellomere I 1.8 × apical width. Forefemoral notch glabrous. Length of midtarsomeres II and III 1.9 and 1.4 × apical width, respectively. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Lateral margins of hind-

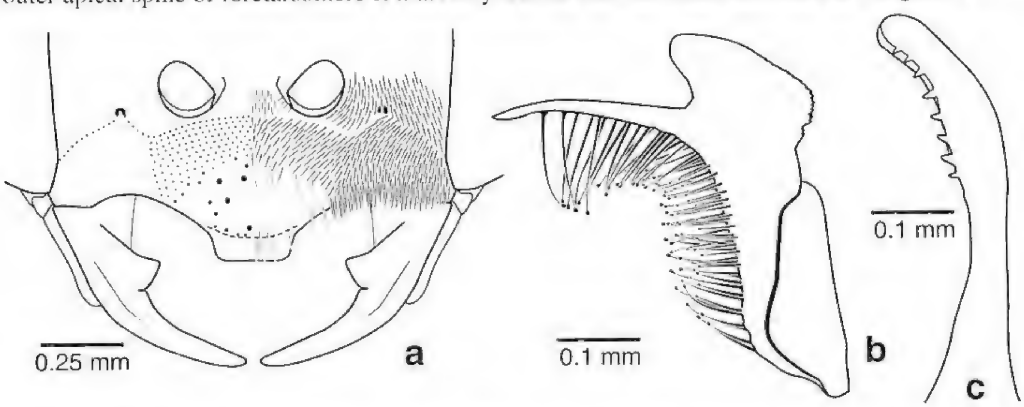

Figure 128. *Tachysphex erectus* Pulawski, sp. nov., male: a – clypeus and mandible; b – volsella; c – penis valve.

tarsomeres II–IV parallel to each other (except basally). Sternum VIII tridentate apically. Length 5.6–6.5 mm. Volsella and penis valve: Figs. 128b, c.

Geographic distribution (Fig. 127).— Known from two localities in Namaqualand region of South Africa.

Records.— Holotype: ♂, **SOUTH AFRICA**: **Northern Cape Province**: Hester Malan [now Goegap] Nature Reserve, 15–21 Oct 1987, F.W. and S.K. Gess (AMG). Paratype: **SOUTH AFRICA**: **Western Cape Province**: Knersvlakte: Kalkgat, 20 Sept–15 Oct 2000, U. Schmiedel and M. Kuhlmann (1 ♂).

Tachysphex erythrophorus Dalla Torre

Figures 129–131.

Tachysphex erythrogaster Cameron, 1889:143, ♀, junior secondary homonym of *Tachysphex erythrogaster* (A. Costa, 1882). Holotype: ♀, India: Maharashtra: Pune (OXUM), examined in 1974.— Nurse, 1909:14 (description of ♂).

Tachysphex erythrophorus Dalla Torre, 1897:679. Substitute name for *Tachysphex erythrogaster* Cameron.— Bohart and Menke, 1976:273 (listed); Krombein and Pulawski, 1994:76 (in revision of Sri Lankan *Tachysphex*); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia).

Tachysphex latissimus R. Turner, 1917c:199, ♀, ♂. Lectotype: ♀, India: Bihar: Pusa (BMNH), designated by Pulawski, 1975:310, examined in 1974. Synonymized with *Tachysphex erythrophorus* by Pulawski, 1975:310.

As *Tachysphex* No. 18 (part, other specimens = *Tachysphex gujaraticus*): de Beaumont, 1940:178 (in revision of Egyptian *Tachysphex*), corrected to *Tachysphex pectoralis* by Pulawski, 1971:126.

As *Tachysphex argentatus*: Gussakovskij, 1952:242 (♀ only), corrected to *Tachysphex pectoralis* by Pulawski, 1971:126.

Tachysphex pectoralis Pulawski, 1964:101, ♀, ♂. Holotype: ♀, Egypt: Abu Rawash NW Cairo (CAS), examined. Synonymized with *Tachysphex erythrophorus* by Pulawski, 1975:310.— Pulawski, 1971:126 (in revision of Palearctic *Tachysphex*); Kazenas, 1978:123, 129 (in key to Sphecidae of Kazakhstan and Central Asia).

Recognition.— *Tachysphex erythrophorus* has sinuous or curved setae that largely conceal the integument on the mesopleuron and scutal forecorner (Fig. 130) and that are oriented posterad on the propodeal dorsum, width of postocellar area markedly greater than length, and a unique shape of the mesothoracic venter: the anterior (oblique) portion is longer than the posterior (horizontal) part (Fig. 130). Subsidiary recognition features are: gaster and legs all or largely red in the female and most males, flagellomere I long (dorsal length 2.2–2.7 × apical width in female and 1.5–2.2 × in male, with ventral length markedly greater than apical width), clypeal lip of female evenly arcuate (Fig. 129a) or with one lateral incision on each side or serrate (but without an admedian pair of teeth), and male forefemoral notch obtusely angulate basally. The male of *gujaraticus* is similar, but has the usual mesothoracic venter (the anterior portion is shorter than the posterior part), the dorsal length of flagellomere I is 1.0–1.4 × apical width, with the ventral length in most specimens subequal to the apical width, and the forefemoral notch of some specimens acutely angulate basally.

Description.— Gena unusually narrow as seen from above. Scutal punctures averaging less than one diameter apart, but discal punctures two to many diameters apart in most females and some males. Mesopleuron dull, granulose. Mesothoracic venter distinctive: anterior (oblique) portion longer than posterior (horizontal) part (Fig. 130). Propodeal dorsum microsculptured; side microsculptured, with vestigial ridges in some specimens. Hindcoxal dorsum with inner margin not carinate.

Setae (numbers in parentheses refer to setal length expressed as a fraction of basal mandibular width): sinuous or curved on gena and thorax, sinuous on propodeum (except straight on propodeal

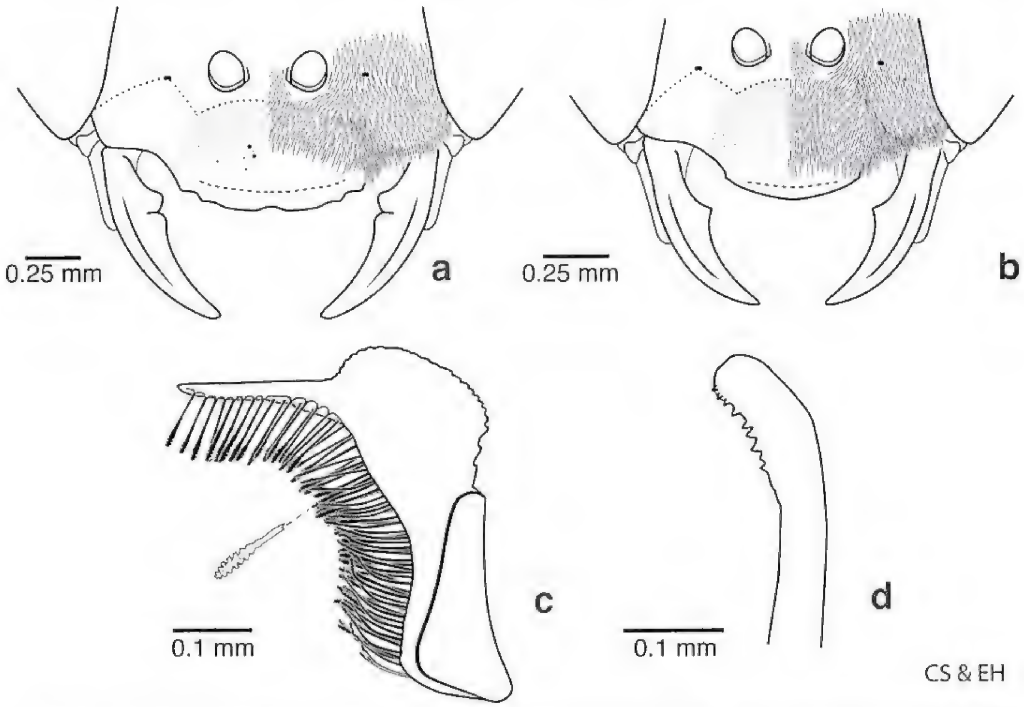

FIGURE 129. *Tachysphex erythrophorus* Dalla Torre: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

side anteriorly); suberect on each side of oral fossa next to occipital carina; appressed on postocellar area and scutal disk (0.2–0.3); totally concealing mesopleural integument in fresh specimens (Fig. 130); oriented posterad on propodeal dorsum (0.5–0.6); appressed or nearly so on midfemoral venter.

FIGURE 130. *Tachysphex erythrophorus* Dalla Torre: female mesopleuron showing long anterior portion (×58).

Head black, but the following are reddish: mandible (except apical third), clypeal lip and bevel (bevel black in some males), and scapal venter. Pronotal lobe yellowish. Color of thorax and legs: see below. Frontal setae silvery in both sexes. Wing membrane hyaline; costal and subcostal veins of forewing yellowish brown. Gaster red except apical segments brown in some males. Terga I–IV in female, I–V or I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 129a): bevel shorter than basomedian area; lip free margin arcuate in some specimens, in others shallowly sinuous laterally or with rudimentary median notch, serrate in some (but without admedian pair of teeth). Width of postocellar area 1.4–1.7 × length. Dorsal length of flagellomere I 2.2–2.7 × apical width. Forefemoral venter microsculptured. Dorsal foretibial surface with two or three spines; outer surface with two or three spines, punctures in apical half sparser than on remaining surface. Forebasitarsus with 7–9 rake spines. Venter of apical tarsomeres with

several thin, erect setae. Tergum V sparsely punctate (with only a few punctures in many specimens), apical depression impunctate, glabrous. Pygidial plate smooth, shiny, with fine, scattered punctures. Length 7.0–10.5 mm. Thorax in many specimens all or partly red. Legs all red or fore-coxa black.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 129b): bevel shorter than basomedian area; lip free margin arcuate or sinuate; distance between corners 1.1–1.3 × distance between corner and orbit. Width of postocellar area 1.6–2.1 × length. Dorsal length of flagellomere I 1.5–2.2 × apical width. Forefemoral notch asetose. Outer margin of forebasitarsus with 4–7 rake spines, apical spine of tarsomere II markedly longer than tarsomere III. Sterna densely, evenly punctate and setose. Hindmargin of sternum VIII varying from almost evenly emarginate to tridentate (as in West African males), but mostly convex mesally. Length 5.5–8.5 mm. Volsella and penis valve: Figs. 129c, d. Thorax black, but mesothorax apicoventrally and metasternum red in many specimens. Legs all red or fore- and midfemora black.

Prey.— A female from Oursi, Burkina Faso, was collected with her prey, a young acridid nymph.

Geographic distribution (Fig. 131).— Mauritania and Egypt to Togo and Benin, Arabian Peninsula, Tajikistan, Turkmenistan, Pakistan, and India.

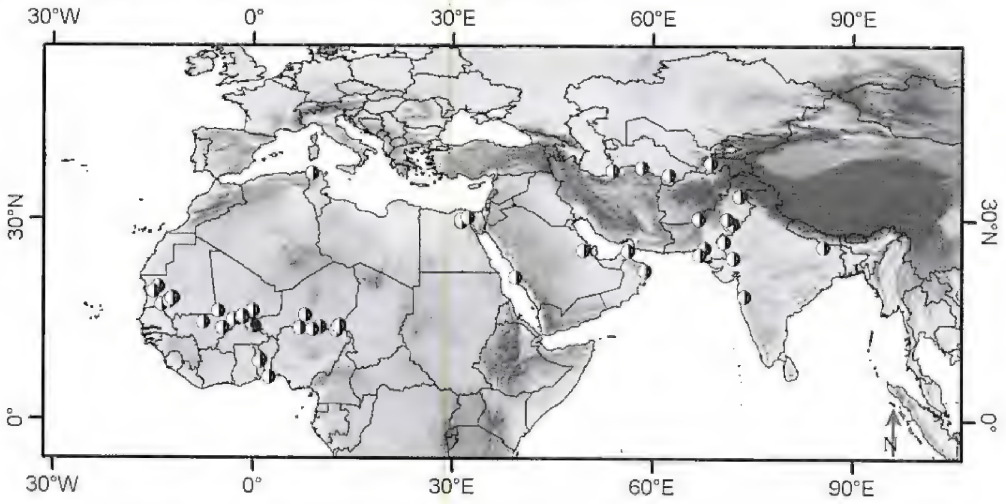

Figure 131. Collecting localities of *Tachysphex erythrophorus*.

Records.— **BENIN**: Cotonou (1 ♀, ZMAN). **BURKINA FASO**: 10 km E Dori at 14°00.5′N 0°03.2′E (2 ♀), 39 km E Dori at 13°58.1′N 0°17.5′E (1 ♀), 4 km NE Dori at 14°03.8′N 0°03.1′W (1 ♀), 7 km WNW Dori at 14°03.7′N 0°06.6′W (1 ♀), 1 km NE Gorom Gorom at 14°27.3′N 0°13.1′W (1 ♀), 15 km SE Gorom Gorom (10 ♀; 2 ♀, SAM), Oursi at 14°40.5′N 0°27.2′W (4 ♀). **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash (2 ♀, 5 ♂, including holotype of *pectoralis*), Dahshur (5 ♀, 4 ♂), Ghiza (1 ♀). **As Sharquiyah**: Serapeum (1 ♂). **INDIA**: **Bihar**: Pusa (1 ♀, BMNH, lectotype of *latissimus*). **Gujarat**: Deesa (5 ♀, 2 ♂, BMNH). **Maharashtra**: Pune (1 ♀, OXUM, holotype of *erythrogaster* Cameron). **Rajasthan**: 30 km SW Jaisalmer = 8 km W Kundhara (1 ♂, STUTTGART). **MALI**: central Adrar (1 ♂, KMG), Douentza (1 ♀; 1 ♂, MS), Gao (1 ♀, BMNH; 1 ♂, KMG; 1 ♀, MS), Hombori (1 ♀, 2 ♂; 7 ♀, 2 ♂, MS), 10 km E Hombori (1 ♂; 2 ♂, MS), 25 km E Hombori (1 ♀, 1 ♂), 30 km NE Hombori (1 ♂, MS), Mourdiah (2 ♀, BMNH), 60 km NE San (1 ♀). **MAURITANIA**: 20 km NE Akjoujt (1 ♀), 20 km NE Aleg (3 ♀), 25 km NE Aleg (1 ♀, MSNT), 25 km SW Moudjéria (8 ♀; 1 ♀, MSNT), 153 km NE Nouakchott (1 ♀, MSNT), Oued Henné ca 50 air km NE Moudjéria (1 ♀), Tamouret Naaj ca 30 air km NE Moudjéria (2 ♀). **NIGER**: **Agadez Region**: 0.5 km SE Aderbissinat at

15°36.9′N 7°54.0′E (1 ♀). **Diffa Region**: 5 km N Diffa at 13°22.2′N 12°36.4′E (1 ♀), 13 km SW Nguigmi at 14°10.3′N 13°01.3′E (5 ♀), 34 km SW Nguigmi at 13°58.8′N 12°58.2′E (1 ♀). **Maradi Region**: 15 km NNW Maradi at 13°37.9′N 7°03.0′E (1 ♀). **Zinder Region**: 21 km W Gouré at 13°51.2′N 10°07.8′E (2 ♀), 45 km S Zinder at 13°27.3′N 9°00.5′E (1 ♀). **OMAN**: Sih Hawayah (1 ♀, KMG). **PAKISTAN**: **Baluchistan**: Quetta (1 ♀). **Punjab**: Bahawalpur (3 ♀, 2 ♂), Lal Suhandra National Park 34 km E Bahawalpur (1 ♀), Muzaffar Garh 35 km SW Multan (1 ♂), Rawalpindi (5 ♀, 1 ♂). **Sind**: Kirthar National Park 150 km NE Karachi, 25°10′–26°05′N 67°10′–67°55′E (3 ♀, 2 ♂), Malir River bed 5 km ESE Karachi International Airport (12 ♂). **SAUDI ARABIA**: Bahra 50 km ESE Jeddah (1 ♂, KMG), Hofuf (1 ♂, KMG). **TAJIKISTAN**: Dushanbe (Pulawski, 1971). **TUNISIA**: Tabarka at 36°58′N 8°45′E (1 ♀, CSE), 15 km E Tabarka at 36°58′N 8°55′E (1 ♀, CSE). **TOGO**: 12 km S Sokodé (6 ♀, 4 ♂), 5 km W Sokodé (3 ♀, 4 ♂), 8 km N Sotoboua (1 ♂). **TURKMENISTAN** (Pulawski, 1971): Askhabad, Hassan-Kuli, Imam Baba near Mary. **UNITED ARAB EMIRATES**: Khor Fakkan (1 ♀, KMG).

Tachysphex erythropus (Spinola)

Figures 132–134.

Lyrops erythropus Spinola, 1839:479, ♀, actually ♂. Lectotype: ♂, Egypt: no specific locality (MSNT), designated by de Beaumont, 1952b:48, examined.— Casolari and Casolari Moreno, 1980:113 (specimens in M. Spinola collection).— As *Larrada erythropus*: F. Smith, 1856:281 (new combination, listed).— As *Tachytes erythropus*: A. Costa, 1867a:84 (new combination, in revision of Italian aculeate wasps); Kohl, 1883b:226 (incorrectly synonymized *fluctuatus* with *erythropus*).— As *Tachysphex erythropus*: Kohl, 1883a:175 (new combination, comparison with *T. graecus*), 1885:394 (tentatively transferred to *Tachysphex*, original description copied); Dalla Torre, 1897:679 (in catalog of world Hymenoptera); de Beaumont, 1952b:47 (study of type material), 1955:181 (Morocco), 1956a:197 (Libya); Grandi, 1957:389 (Libya); Suárez, 1959:57 (Spain); de Beaumont, 1960a:16 (Greece: Island of Rhodes), 1960b:238 (Libya); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); de Beaumont, 1965:48 (Greece); Myartseva, 1965:77 (Turkmenistan); de Beaumont, 1966:212 (Egypt); Pulawski, 1967:397 (Turkey), 1971:408 (in revision of Palearctic *Tachysphex*); Kazenas, 1972:161 (Kazakhstan); Myartseva, 1972a:78 (Turkmenistan); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Krombein, 1974:452 (SW Egypt); Bohart and Menke, 1976:273 (listed); Kazenas, 1978:115, 127 (in key to Sphecidae of Kazakhstan and Central Asia); Guichard, 1980:227 (Oman); Gayubo, 1984b:363 (Portugal); Gayubo and Tormos, 1984:15 (Spain); Islamov, 1986:525 (Uzbekistan); Gayubo, 1987:112 (Spain); Tormos and Jiménez, 1987a:125 (Spain); Asís and Jiménez, 1988:271 (Spain); Gayubo and Mingo, 1988:78 (Spain); Pagliano, 1990:103 (Italy); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Gayubo and Borsato, 1994:207 (Italy); Krombein and Pulawski, 1994:95 (in revision of Sri Lankan *Tachysphex*); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Pagliano and Scaramozzino, 1995:732 (Italy); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia); Schmidt and Bitsch *in* Bitsch et al., 2001:246 (in Sphecid Fauna of Western Europe); Kazenas 2002:67 (Kazakhstan).

Tachytes maracandicus Radoszkowski, 1877:26, ♂ (as *Maracandica*, incorrect original capitalization and termination). Lectotype: ♂, Uzbekistan: Durman-kul (ZMMU), designated by Pulawski, 1971:411, examined before 1971. Synonymized with *Tachysphex erythropus* by Pulawski, 1971:408 and 411.— Magretti, 1884:588 (Sudan); Radoszkowski, 1887:44 (China: Tsaidam); nec Radoszkowski, 1886:32, 1891:590, and de Beaumont, 1936b:612 (= *Tachysphex persa confinis*).— As *Tachysphex maracandicus*: Kohl, 1885:396 (tentative new combination, original description copied); Dalla Torre, 1897:681 (in catalog of world Hymenoptera).

Tachytes flavogeniculatus Taschenberg, 1880:778, ♂. Lectotype: ♂, Ethiopia: no specific locality (HALLE), designated by Pulawski *in* Krombein and Pulawski, 1994:97, examined. Synonymized with *Tachysphex erythropus* by Pulawski *in* Krombein and Pulawski, 1994:97.— As *Tachysphex flavogeniculatus*: Kohl, 1885:402 (new combination, listed); Dalla Torre, 1897:679 (in catalog of world Hymenoptera); Arnold, 1923:175 (listed); Bohart and Menke, 1976:273 (listed).

Tachysphex heliopolites Morice, 1897:306, ♀, ♂ (♂ = *Tachysphex albocinctus*). Lectotype: ♀, Egypt: Zeitun

near Cairo (OXUM), designated by Pulawski, 1971:411, reexamined in 1974. Synonymized with *Tachysphex mantivorus* by de Beaumont, 1947a:172.— Mercet, 1910:165 (listed from Spain); von Schulthess, 1926b:215 (Tunisia); Nadig, 1933:79 (comparison with *syriacus*); Giner Marí, 1943a:139 (in Sphecid Fauna of Spain).

Tachysphex inventus Nurse, 1903:516, ♂. Lectotype: ♂, India: Gujarat: Deesa (BMNH), designated by Pulawski, 1975:313, examined in 1974. Synonymized with *Tachysphex erythropus* by Pulawski, 1975:313.

Tachysphex mantivorus de Beaumont, 1940:169, ♀, ♂ (as *mantivora*, incorrect original termination). Lectotype: ♀, Greece: no specific locality (NHMW), designated by de Beaumont, 1947a:175, examined. Synonymized with *Tachysphex erythropus* by de Beaumont, 1952b:47.— de Beaumont, 1947a:172 (in revision of Egyptian *Tachysphex*); de Andrade, 1949:16 (Portugal); de Beaumont, 1950a:405 (Algeria), 1950b:18 (Egypt); Balthasar, 1954:269 (Palestine); Bytinski-Salz, 1956:226 (Turkey); Diniz, 1964:5 (Portugal).

As *Tachysphex fluctuatus* (collectively corrected to *Tachysphex mantivorus* by de Beaumont, 1940:169): Kohl, 1885:365 (in revision of Larrini); nec F. Morawitz, 1894:342 (= *Tachysphex sordidus*); W. Fox, 1896:554 (Somalia); W. Schulz, 1904:102 (Greece); von Schulthess, 1909:442 (Libya); Mercet, 1910:165 (listed from Spain); Morice, 1911:101 (Algeria); Dusmet, 1915:87 (Spain); von Schulthess, 1926:215 (Libya); Kruger, 1929:21 (Libya, as *fluctuosus*); Guiglia, 1932b:474 (Libya); Gussakovskij, 1933:280 (Iran); Nadig, 1933:79 (Morocco); Guiglia *in* Zavattari, 1934:303 (Libya); Gussakovskij, 1935:426 (Tajikistan); de Beaumont, 1936b:614 (Caucasus, Transcaspia), 1936c:8 (specimens in A. Costa collection); Rungs, 1936:24 (Morocco); nec Móczár, 1938:80 (= *Tachysphex costae*); Guiglia, 1939a:187 (Libya), 1940:292 (Libya), 1942:234 (summary of Libyan records); Honoré, 1942:56 (in checklist of Egyptian Sphecidae); Giner Marí, 1943:139 (in Sphecid Fauna of Spain), 1947:25 (Western Sahara); Ceballos, 1956:376 (listed from Spain); Myartseva, 1963:58 (Turkmenistan: lower Murgab River).

As *Tachytes sericea*: De Stefani Perez, 1886:171 (Italy: Sicilia), 1895:226 (in catalog of Sicilian Hymenoptera).

As *Tachysphex simillimus* (♂ only): Gussakovskij, 1952:235, corrected to *Tachysphex erythropus* by Pulawski, 1971:409.

Interpretation of the species name.— The lectotype of *erythropus*, a male, is poorly preserved, but the remaining straight setae on the upper mesopleuron and the characteristic crest-like, glabrous bottom of the forefemoral notch leave no doubt about the interpretation of this species.

Recognition.— *Tachysphex erythropus* has the apical depression of sternum I intersected by a longitudinal carina (Fig. 132a), hindwing vein cu-a oblique (anal end further away from wing base than cubital end), setae straight on the head and thorax (many setae are angled apically), and male sternum III with setae markedly longer apically than basolaterally.

The female of *erythropus* has the pygidial plate not margined laterally, at least next to the apex, a large part of it being delineated by a row of setigerous punctures (Figs. 132d, e) in most specimens. The only other *Tachysphex* with a reduced lateral pygidial carina are *luxuriosus* and the Australian *nepharius*, both strikingly different.

The male of *erythropus* has a compressed forefemoral notch whose glabrous bottom forms a longitudinal crest, without erect setae at the notch's proximal end (Fig. 133a). The notch is similar in some *sericeus* in which, however, at least some setae on the head and thorax are sinuous and, in many southern African specimens, the setae are erect adjacent to notch's proximal end.

Description.— Gena unusually narrow in dorsal view. Scutal punctures less than one diameter apart or discal punctures up to about two diameters apart. Mesopleuron dull, markedly microsculptured, with shallow, ill-defined punctures. Propodeal dorsum irregularly rugose or irregularly ridged longitudinally, evenly microareolate in some small specimens, intersecting posterior surface at about right angle; propodeal side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end further away from

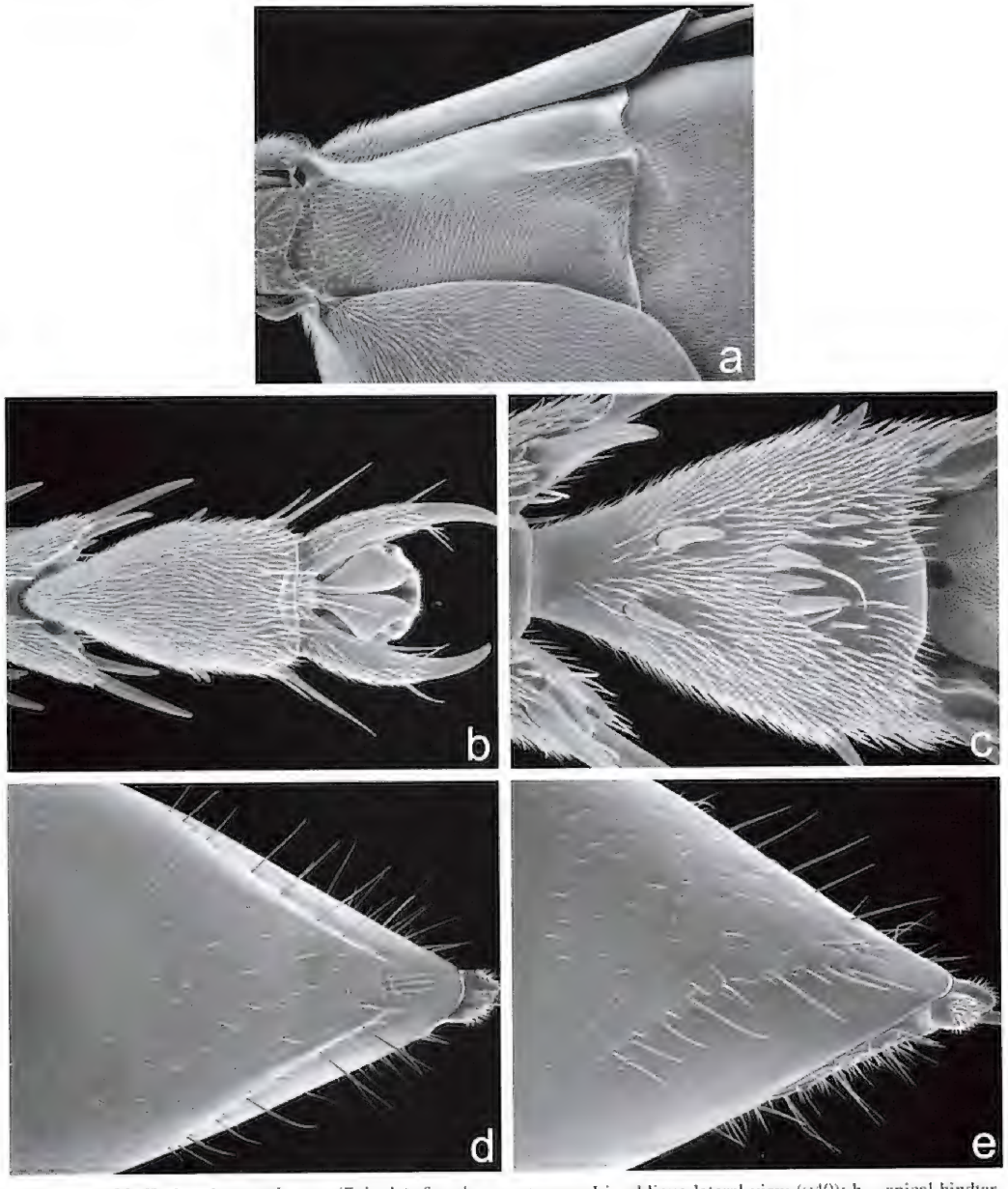

FIGURE 132. *Tachysphex erythropus* (Spinola), female: a – sternum I in oblique lateral view (×40); b – apical hindtarsomere in dorsal view (×69); c – same in ventral view (×150); d – tergum VI in dorsal view (×48); e – same in oblique lateral view (×29).

wing base than cubital end). Hindcoxal dorsum with inner margin carinate basally, not carinate in some males. Sternum I with apical depression bisected by longitudinal, obtuse carina (Fig. 133a).

Setae: appressed on interocellar area; erect on postocellar area (about one midocellar diameter long); suberect to erect on each side of oral fossa next to occipital carina (length about 0.4 × basal mandibular width); forecoxal and most thoracic setae straight except angled apically, but scutal

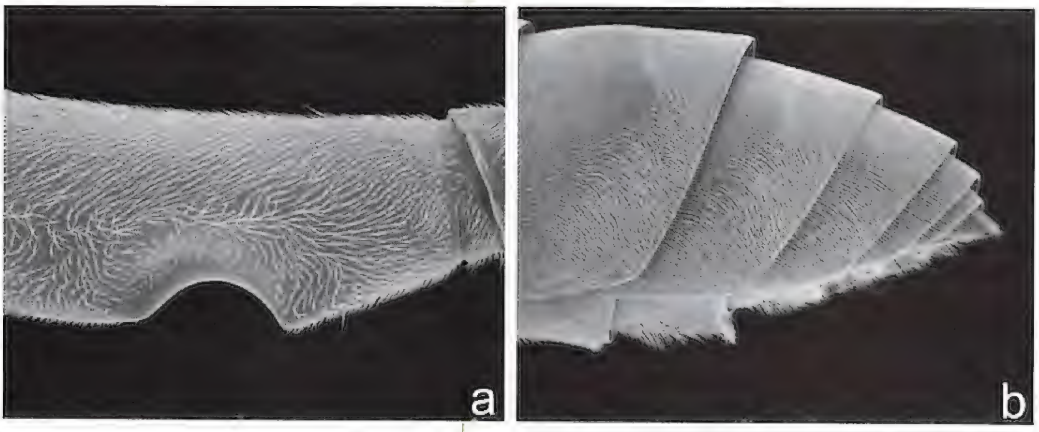

FIGURE 133. *Tachysphex erythropus* (Spinola), male: a – base of forefemur (×75); b – gastral segments II – VII in lateral view (×24).

setae straight (and nearly appressed); oriented posterad (nearly erect) on propodeal dorsum, about × 0.4 basal mandibular width.

Head, thorax, and gaster black, mandible red mesally. Frontal and clypeal setae silvery in female and smallest males, golden in most males. Wings hyaline; forewing costal vein light brown, subcostal vein light brown to dark brown. Color of legs: see below. Terga I–IV in female, I and II to I–IV in male, silvery fasciate apically (see Variation below for details).

♀.— Labrum with well-defined notch. Clypeus: bevel convex, conspicuously shorter than basomedian area; lip almost straight, emarginate mesally but not incised laterally (median notch absent in worn specimens). Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.8–2.1 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two or three spines. Forebasitarsus with 14–16 rake spines (spines divided into proximal and distal groups in most specimens, or with a spine between them). Apical mid- and hindtarsomeres with one or two spines at midlength of each lateral margin (Fig. 132b), venter with a cluster of preapical spines (Fig. 132c). Apical depression of tergum V impunctate, glabrous. Pygidial plate with lateral carina absent at least apically. Length 9.0–14.0 mm. Forefemur black except red apically in most populations but all red in some females from West Africa, mid- and hindfemora partly to all red, tibiae and tarsi red.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel rudimentary; free margin of lip arcuate or slightly sinuate, with well-defined corner; distance between corners 1.2–1.4 × distance between corner and orbit. Width of postocellar area 0.3–0.6 × length. Dorsal length of flagellomere I 1.6–2.0 × apical length. Forefemoral notch without basal tuft of erect setae, its glabrous bottom compressed into narrow, longitudinal crest (Fig. 133a). Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Sternum II: setae no longer on apical depression than on remaining surface. Apical depressions of sterna III–VI with subappressed setae (which appear agglutinated on sternum III apicomesally); setae markedly longer than on remaining surface (Fig. 133b). Length 8.5–13.0 mm. Volsella and penis valve as in *costae* (Figs. 102b, c). Femora black (except apically), tibiae and tarsi red (tibiae partly darkened in some specimens, starting with hindtibiae).

VARIATION.— Silvery tergal fasciae, in the male, are present on segments I–III in specimens from Europe, Asia, and North Africa, but only on terga I and II in some specimens from Egypt, and on terga I–IV in males from the other African countries (Mauritania and Senegal to Tanzania).

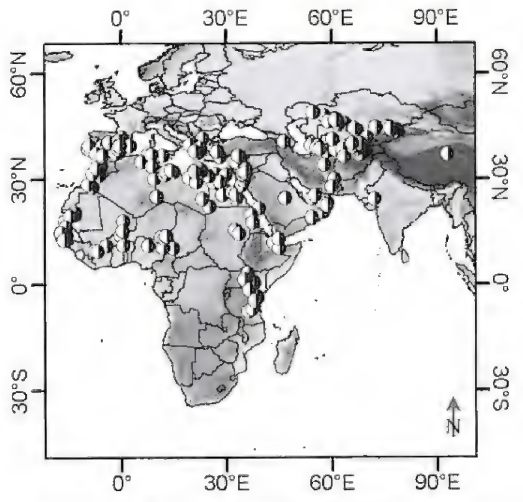

FIGURE 134. Collecting localities of *Tachysphex erythropus*.

GEOGRAPHIC DISTRIBUTION (Fig. 134).— Mediterranean Basin (north to Iberian Peninsula, Italy, Greece, Bulgaria, Cyprus, Turkey, Israel), south to Nigeria and Tanzania, also Arabian Peninsula, Azerbaijan, Transcaspia (Kazakhstan, Uzbekistan, Turkmenistan, and Tajikistan), Iran, India (Gujarat State only), and China (Tsaidam region only).

RECORDS.— **ALGERIA**: Annaba (Morice, 1911, as Bône), Biskra (Morice, 1911), Tindouf (de Beaumont, 1950a). **AZERBAIJAN**: Gäncä (Pulawski, 1971). **BULGARIA**: Sandanski (4 ♀, 5 ♂). **BURKINA FASO**: 4 km NE Dori at 14°03.8′N 0°03.1′W (1 ♀), 10 km E Dori at 14°0.05′N 0°03.2′E (1 ♀), Kompienga 20 km S Pama (1 ♀, 1 ♂; 2 ♀, 2 ♂, LEM), Pala near Bobo Dioulasso (1 ♂). **CAMEROON**: Moulvouday at 10°25′N 14°53′E (1 ♂, FSAG). **CHINA**: **Tsinghai**: Tsaidam region: no specific locality (Radoszkowski, 1887). **CYPRUS**: Ayia Napa 10 km W Capo Greco (1 ♂; 3 ♂, SCHL), Cherkes (2 ♀, 1 ♂), Famagusta (3 ♂), Kakomallis Mts. (1 ♂), Limassol (5 ♂), Polis (1 ♂, SCHL), Yermasoyia River (4 ♀, 4 ♂), Zakaki (1 ♀, 1 ♂). **DJIBOUTI**: Obock (1 ♂, MNHN). **EGYPT** (Pulawski, 1971, or as indicated): **Al Fayyum**: Karanis (2 ♀, 8 ♂), Kom Osheim (1 ♀, 5 ♂). **Al Iskanderiyah** (= Alexandria): Abukir (de Beaumont, 1940), Amrye (de Beaumont, 1966), Mariout (Honoré, 1942). **Al Jizah** (= Ghiza): Abu Rawash (1 ♂), Ghiza (1 ♂), Hawamdieh (Honoré, 1942), Saqqara. **Al Qahirah** (= Cairo): Cairo, Helwan, Maadi (1 ♀), Wadi el Tih (1 ♂, SAM), Zeitun (Morice, 1897). **Al-Wadi al-Jadid**: Dakhla oasis: Budhkula and Mut (1 ♂, ZMAN); Karkur Ekdui in Gebel 'Uweinat (border of Sudan and Libya); Siwa oasis (de Beaumont, 1950b): El Arig, Ilrhabid Nachou, Koreishid. **Al-Uqsur** (= Luxor): 15 km S Luxor (1 ♀, CSE). **As Suways**: Wadi Quiseb at 29°24′38″N 32°2′40″E (1 ♀, AMNH). **Aswan**: Kom Ombo (2 ♂). **Matruh**: NW Bahariya oasis at 29°17′57″N 28°13′53″E (2 ♀, AMNH), Marsa Matruh (1 ♀, 1 ♂), 25–35 km W Marsa Matruh (1 ♂). **Sawhaj**: 4 km W Abydos (4 ♂). **Sina** (= Sinai): El Mussa (de Beaumont, 1940), Wadi Ghaib 50 km SSE Nuweiba (1 ♂), Wadi Khreza 40 km N Sharm el Sheikh (1 ♂), Wadi Watir. **ETHIOPIA**: no specific locality (2 ♂, HALLE, lectotype and paralectotype of *flavogeniculatus*). **GREECE**: **Aegean Islands**: Rhodes: Fanes (1 ♂), Haraki at Gaiduras River (1 ♂, CSE), Ixia (de Beaumont, 1960a). **Epirus**: Epirus (W. Schulz, 1904). **Ionian Islands**: Corfu (Pulawski, 1971). **Pelopónnisos** (de Beaumont, 1965): Olympia, Patras, Xylocastron, also Killini (1 ♀, SCHL). **Sterea Ellás** (= Central Greece): Thermopylai (1 ♂). **INDIA**: **Gujarat**: Deesa (1 ♂, BMNH, lectotype of *inventus*). **IRAN** (Pulawski, 1971): **Baluchestan va Sistan**: Hurmuk. **Kerman**: Bazman. **Khorasan**: no specific locality. **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973, or as indicated): Ashkelon, 8 km NNE Ashkelon (1 ♀, CSE), Beeri, Beersheba, Bir Rehme = Kfar Yeroham (1 ♂), Bne Brak, Elat, En Gedi on Dead Sea (1 ♂), En Hazeva 35 km S Dead Sea, Jericho, Jerusalem, Masada, Mezad Aqrabbim 45 km SE Beersheba (3 ♀, CSE), Nir Am, Pardes Hanna, Ramat Gan 5 km E Tel Aviv, Ruhama, Shibolim, Tel Aviv, Tiberias, Wadi el Kelt near Jericho (Balthasar, 1954), Wadi Quilt. **ITALY**: **Lazio**: Sasso Furbara (Pagliano, 1990). **Sicilia**: Isola di Pantelleria (Gayubo and Borsato, 1994; Pagliano and Scaramozzino, 1995). **IVORY COAST**: Bouaké: Foroforo (1 ♂, UCD), 20 km W Boundiali (1 ♂). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: Malyie Barsuky sands (P), Saralzhin (K), Uil (K, P). **Almaty**: 20 km N Aidarly village in Sarytaukum Desert at about 44.5°N 76°E (K), 15 km E Ayak-Kalkan on Ili River at about 44°N 78.5°E (K), 17 km NW and 65 km W Bakanas (K), Chilik (K), 30–60 km E Chilik (K), 20–25 km SE Chingil'dy at about 44°N 77.5°E (K), Ili 70 km NNE Almaty (P), Kapchagai (K), 20 km NW Kapchagai (K), Kaskelen River 50 km N Almaty (1 ♀, 1 ♂), 5 km SW Kazakhstan village on Kurty River at about 44.5°N 76.5°E. **Qostanay**: Zhalanash (K), 35 km NW Zhalanash (K). **Qyzylorda**: 5–8 km S Akespe = 80 km W Aral'sk at about 47°N 60.5°E (K), 6 km W Amanotkel' village at about 46°N 61.5°E (K), 10 km NW and 15 km SE Aral'sk (K), Chokusu railroad sta-

tion 30 km NW Saksaul'skiy (K), Dzhulek = Chiili (P), Dzhusaly village at about 45.5°N 64°E (K), 3 km NW Kamyshlybash (K), 30 km WSW Kamyshlybash (1 ♀ 15 km S and 23 SW Kazalinsk (K), 14 km SE Saksaul'skiy (K), 3 and 20 km S Yany-Kurgan (K). **South Kazakhstan**: 5–8 km SW Chardara (K). **Zhambyl**: 50–70 km NW Furmanovka. **Location unknown**: Diirmentobe on Syr Darya River (1 ♂). **KENYA**: **Coast Province**: Kitani Lodge in Tsavo West National Park (3 ♂, USNM), Taita Discovery Centre (1 ♀), Voi (1 ♂), Voi area (1 ♀, 35 ♂, OÖLM). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (2 ♀, 6 ♂), 5 km NNE Isiolo (1 ♀). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♀, 4 ♂; 1 ♂, USU), near W shore of Lake Turkana (3 ♂), Magadi road 46 air km SW Nairobi (1 ♀, 7 ♂; 4 ♂, NMK), Marich Pass Field Studies Centre (1 ♀, 6 ♂; 2 ♂, NMK), Matembur in West Pokot District (1 ♂, PMA), Olorgesailie (2 ♂). **LIBYA** (de Beaumont, 1960b, or as indicated): Es Sahabi (Guiglia, 1932). **Al-Kufrah oasis** (Guiglia, 1931): Al-Kufrah. **Cyrenaica**: Apollonia, Barce, Brèga 40 km E El Agheila, 20 km E El Agheila, El Hag (Guiglia, 1940), Es Shegga (Kruger, 1929), Gebel Awenal (1 ♂, MILANO, determined *fluctuatus* by D. Guiglia), Jalu (Guiglia, 1932, as Gialo), Jarabub (Kruger, 1929), Latrun, Ras el Hilal, Tmimi, Wadi Derna, Wadi El Mra. **Fezzan** (Guiglia, 1939a): Al Barkat, Gat, Tunin. **Tripolitania**: Bir el Hamra 50 km SW Mizda (de Beaumont, 1956a), Corradini (de Beaumont, 1956a), Garian (de Beaumont, 1956a), Tauorga = Tavorga, Wadi Kaam (Grandi, 1957). **MALI**: Anefis = Anevis (1 ♀, KMG), 30 km S Ansongo (1 ♂, KMG), Kuorouma (1 ♀). **MAURITANIA**: Nouakchott (1 ♂, FB), Tayart 7 km W Atar (1 ♂), Toungat (1 ♂, FB), 19°30′N 14°30′W (1 ♂, KMG). **MOROCCO** (Pulawski, 1971, or as indicated): El Kelaa des M'Gouna on southern slope of Grand Atlas (Rungs, 1936), Imiter (de Beaumont, 1955), Maader Telmaout, Marrakech, Meknès (2 ♂), Melilla, Tahar Souk. **NIGER**: **Diffa Region**: 54 km NE Diffa at 13°42.3′N 12°55.8′E (1 ♂), 71 km NE Diffa at 13°53.0′N 12°56.3′E (1 ♂), 20 km SW Diffa at 13°13.1′N 12°25.9′E (1 ♂). **NIGERIA**: Azare in southeastern Kano (4 ♂, BMNH), Zaria between Maigana and Soba (1 ♂, USNM). **OMAN**: Hail al Ghaf at 23°09.7′N 58°55.5′E (3 ♀, 2 ♂; 2 ♂, OHL), 250 km S Nizwa (2 ♂, CSE), 253 km S Nizwa at 20°43.3′N 57°04.4′E (3 ♂; 2 ♂, NHMO), Wadi Ghul near Nizwa 22°53.0′N 57°31.2′E (1 ♀), Wadi Mahram in Sumait Wilayat (2 ♂, OHL), Wadi Qitbit at 19°09.4′N 54°30.5′E (1 ♂), Wahiba Sands 11 km S Al Qabil at 22°31.0′N 58°41.2.E (1 ♀). **Dhofar**: Wadi Bihr (1 ♀, KMG). **PORTUGAL** (de Andrade, 1949, or as indicated): Cascais: Boca do Inferno, Lisboa: Benfica, Pegões (Diniz, 1964; Gayubo, 1984b), Pulo do Lobo 20 km N Mertola at 37°49′N 7°38′W (1 ♂, CSE), Setubal (1 ♂), Trafaria, Vale de Gaio. **SAUDI ARABIA**: El Riyadh (2 ♂), Jeddah (1 ♀, BMNH), Wadi Nissah: Shaib Luha near Al Ha'ir (1 ♂, FSCA). **SENEGAL**: Bayakh 48 km E Dakar (1 ♂; 1 ♂, MSNT), Gulf of Bandiala ca 13°38′N 16°38′W (2 ♂; 1 ♀, 2 ♂, KMG), Kaffrine (3 ♂), Ndangane 45 air km SE Mbour (10 ♂, FB), Richard Toll (1 ♀), 5 km SW Thiès (1 ♂, MSNT), Toubacouta (1 ♂, FB), Zinguinchor (1 ♂, MSNT). **SOMALIA**: Berbera (1 ♂, ANSP). **SPAIN** (Gayubo and Mingo, 1988, or as indicated): **Alicante**: Alicante, Benidorm (1 ♀, 1 ♂), Guardamar del Segura, Muchamiel, San Vicente del Raspeig. **Almería** Almería (Pulawski, 1971), Gérgal (1 ♂), Mojacar (Pulawski, 1971). **Caceres**: Guadalupe (Pulawski, 1971). **Cadiz**: Jerez de la Frontera (3 ♂). **Castellón**: Vall d'Almonacid (Asís and Jiménez, 1988). **Ciudad Real** (Gayubo, 1987): Pozuelos, Robledo, Valenzuela de Calatrava. **Granada**: Ronda (Pulawski, 1971). **Huelva**: Punta Umbria (Pulawski, 1971). **Huesca**: Monzon (1 ♂). **Jaen**: Las Correderas (1 ♂). **Madrid**: Madrid (1 ♀), Montarco, Ribas de Jarama. **Málaga**: Ronda (Pulawski, 1971). **Mallorca**: Palma (Pulawski, 1971). **Murcia**: Aguilas. **Teruel**: Oliete (Dusmet, 1915). **Valencia**: Barranco de Carraixet (Tormos and Jiménez, 1987a), Cañada, Moncada, and Serra (Gayubo and Tormos, 1984), Torrente. **SUDAN**: Khartum (1 ♀, KMG; 1 ♂, ZMAN), Khor Arbaat Delta (1 ♂, BMNH), Khor Langhebb between Sauakin and Kassala (Magretti, 1884), Khor Menize (1 ♀, BMNH), Wadi Medani (1 ♀, BMNH). **TAJIKISTAN**: Ayvaj in mouth of Kafirnigan River (1 ♀, 1 ♂), Kulab (Gussakovskij, 1935), Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TANZANIA**: **Iringa Region**: 75 km ENE Iringa (1 ♀). **Morogoro Region**: 48 km W Morogoro (1 ♂). **Tanga Region**: 73 km NW Korogwe (1 ♂), 2 km NE Mkomazi (1 ♂). **TUNISIA**: Kebili (1 ♀, SCHL), Tabarka (2 ♂, CSE). **TURKEY**: **Aydin**: Ortaklar (Pulawski, 1971). **Içel**: Silifke (1 ♂, OÖLM). **Izmir**: Kusdasi (1 ♂). **Mersin**: Mut (1 ♂). **TURKMENISTAN** (Pulawski, 1971, or as indicated): Akhcha-Kyuma (Myartseva, 1972a), Akibay (Myartseva, 1965), Askhabad, Bayram-Ali, Djebel near Nebit-Dagh, Farab, Ghyaurs, Hoja 12 km from Ghyaurs (1 ♀, 2 ♂), 15 km S Iskander station, Kara-Kala, lower Murgab River valley (Myartseva, 1963, 1972a), Repetek, Sary-Chop 180 km S Mary. **UNITED ARAB EMIRATES**: Abu Dhabi (1 ♀, KMG), Dubai: Awir (1 ♀, UCD). **UZBEKISTAN** (Pulawski, 1971, or as indicated): Baysuntau Range foothills (Islamov, 1986), Durman-kul near Samarkand (1 ♂, ZMMU, lectotype of *maracan-*

dicus), Khiva, Samarkand, Sidjak village in Ugam Range (Islamov, 1986), Tashkent (including Krasnaya Voda and Mayskoye), Yargak near Khatyrchi (30 km WNW Katta Kurgan). **YEMEN**: Lahj (1 ♀, RMNH).

***Tachysphex erythrurus* Pulawski, sp. nov.**
Figures 127, 135.

Derivation of name.— *Erythrurus*, a combination of the Greek words *erythros*, red, and *oura*, tail. With reference to the red gastral apex of this species.

Recognition.— *Tachysphex erythrurus* has the gaster black basally and contrastingly reddish apically (two segments reddish in the female and three or four in the male) and at least basal flagellomeres reddish brown or yellowish brown (all or only ventrally). This color pattern is not found elsewhere in the genus. The species is further characterized by well-defined mesopleural punctures (minute in many specimens) and unsculptured, shiny interspaces, red tibiae, and also by the setae erect on the postocellar area (Figs. 135a, b) and scutum, erect or suberect on the midfemoral venter, and oriented obliquely anterad on the propodeal dorsum. In the female, the middle clypeal section is almost flat, the bevel is ill defined, not contrasting with the basomedian area, and the tarsi are unspecialized (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins). In the male, flagellomere I is unusually short, with the ventral margin about as long as apical width in some specimens.

The female of *erythrurus* resembles *omoi*, but differs by the color pattern described above, lack of a well-defined clypeal bevel, and shorter setae of the midfemoral venter (length about two-thirds of midocellar diameter rather than one diameter).

Description.— Scutal punctures well defined, several diameters apart on disk, interspaces unsculptured, shiny. Mesopleural punctures well defined (minute in female and many males), several diameters apart, interspaces unsculptured, shiny. Episternal sulcus complete or incomplete. Propodeal dorsum ridged; side ridged. Hindcoxal dorsum with inner margin carinate, carina slightly expanded basally.

Setae nearly erect on each side of oral fossa next to occipital carina, about 0.4 × basal mandibular width; erect on postocellar area (Figs. 135a, b), about 0.4–0.6 × basal mandibular width; erect on scutum; suberect to nearly erect, about 0.7 of midocellar diameter long on midfemoral venter; inclined obliquely anterad on propodeal dorsum.

Head and thorax black, mandible yellowish red except basally and apically; palpi pale yellow in specimen from Tana River, Kenya; scape, pedicel, flagellomeres I and II, and at least venter of flagellomere III reddish brown in most specimens (only venters of flagellomeres I and II reddish brown in a male from Marich Pass, Kenya); antenna yellowish brown in specimen from Tana River except flagellomeres III–XI darkened dorsally. Frontal and clypeal setae golden in both sexes except silvery in single male from Tana River; frontal setae sparse in female. Wing membrane slightly infumate; costal vein of forewing brown, subcostal vein black (pale yellow and brown, respectively, in specimen from Tana River). Femora varying from all red to all black (femoral apex red); tibiae and tarsi red. Gastral base black (segments I–III in some males, I–IV in female and other males), remainder red; also sternum III red in specimen from Tana River. Terga I–IV silvery fasciate apically, but fasciae interrupted mesally.

♀.— Clypeus (Fig. 135c): middle section nearly flat, bevel ill defined; lip free margin arcuate, not incised laterally. Width of postocellar area 1.9–2.0 × length. Dorsal length of flagellomere I 2.2–2.5 × apical width. Forefemoral venter with numerous, minute punctures that are several diameters apart. Dorsal foretibial surface with a few fine bristles; outer surface with one spine. Forebasitarsus with 4–6 rake spines. Apical depression of tergum V asetose or with a few, isolated setae. Pygidial plate aciculate, impunctate. Length 6.1–7.4 mm.

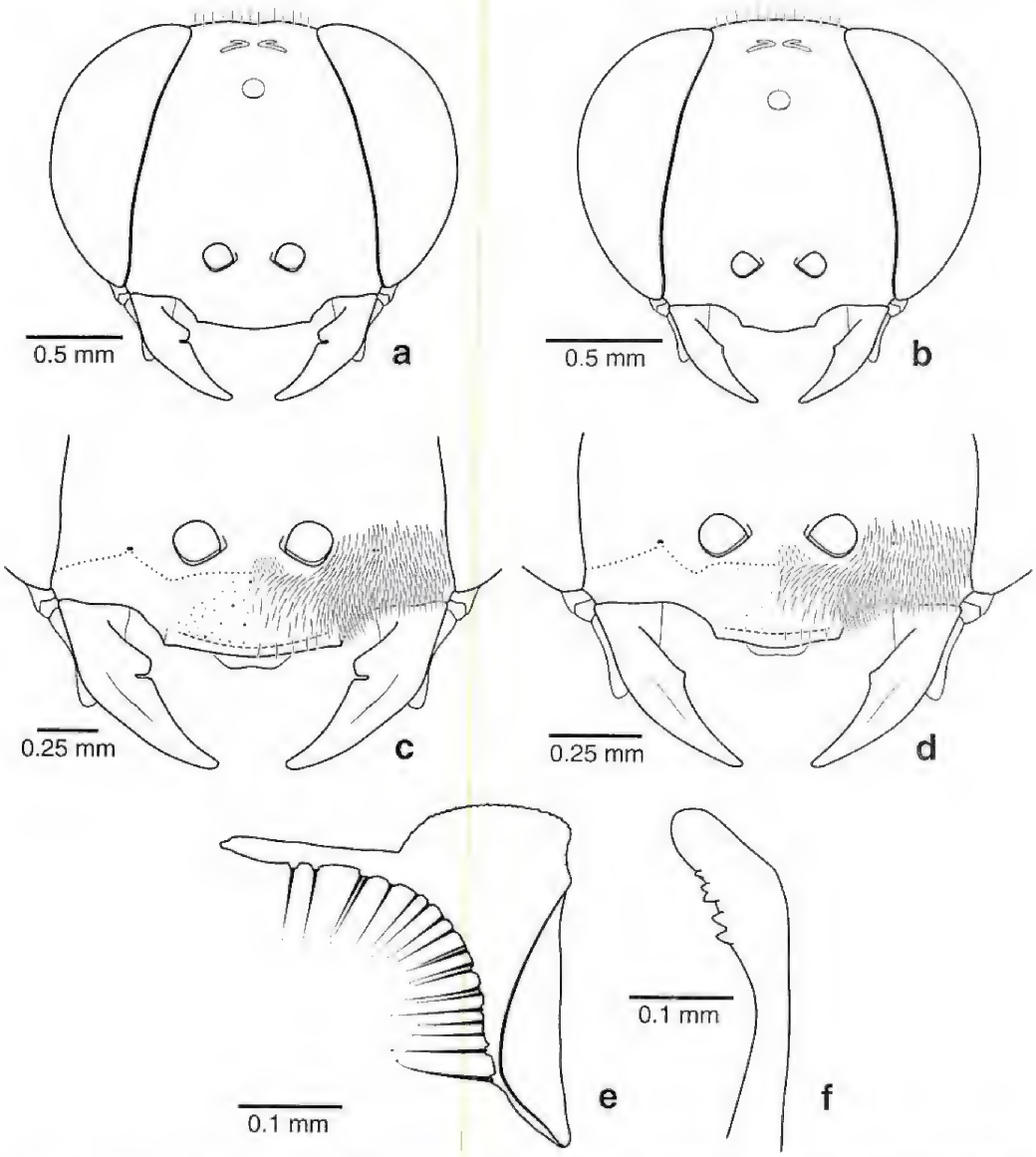

FIGURE 135. *Tachysphex erythrurus* Pulawski, sp. nov.: a – female head; b – male head; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 135d): bevel shorter than basomedian area; lip free margin arcuate or sinuate, with well-defined corner; distance between corners equal to distance between corner and orbit. Width of postocellar area 2.2–2.8 × length. Dorsal length of flagellomere I 1.2 × apical width, ventral length equal to apical width in some specimens. Length of flagellomere III about 0.8 of IV. Forefemoral notch with bottom glabrous. Outer margin of forebasitarsus with 2–4 rake spines; outer apical spine of foretarsomere II as long as or slightly shorter than tarsomere III. Sterna IV–VI in some specimens largely impunc-

tate and glabrous. Sternum VIII, in some specimens, with inconspicuous tooth in middle of apical emargination. Length 4.5–6.5 mm. Volsella and penis valve: Figs. 135e, f.

NEST AND PREY.— Maureen H. Bourbin noticed a female entering an open nest 73 km NW Korogwe on 27 June 2001. The nest was established in a hard-packed sandy soil, without vegetation, on a slightly inclined edge of a small seasonal stream, completely dry by then. The female was not carrying any prey. The nest, approximately 1.5 cm long, was a horizontal gallery that ended in a single cell. Three fully paralyzed prey were found inside, young instar acridid nymphs.

GEOGRAPHIC DISTRIBUTION (Fig. 127).— Kenya, Tanzania.

RECORDS.— HOLOTYPE: ♀, **KENYA**: **Rift Valley Province**: Marich Pass Field Studies Centre, 9–13 July 1999, J.S. Schweikert and WJP (CAS). PARATYPES: **KENYA**: **Coast Province**: Taita Discovery Centre, 29 May 2000 and 9 Sept 2001, Edwin Selempo (2 ♀). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post, 2–8 Dec 2002, M.A. Prentice (1 ♀); 94 km E Thika, 5 July 1999, J.S. Schweikert and WJP (1 ♂). **Rift Valley Province**: Marich Pass Field Studies Centre, J.S. Schweikert and WJP, 9–13 July 1999 (1 ♂), 25–29 July 1999 (1 ♂); same locality, V.F. Lee and WJP, 11–12 May 2000 (1 ♂), 14–17 May 2000 (8 ♂); same locality, 26–27 Nov 2002, M.A. Prentice (1 ♀). **Province unknown** (probably Eastern or Coast): River Tana, 20–22 July 1983, Collins and Ritchie (1 ♂, BMNH). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe, 27 June 2001, M.H. Bourbin and WJP (1 ♀); same locality, Omary S. Haji and WJP, 18 July 2001 (2 ♀, 1 ♂), 19–20 July 2001 (2 ♂).

Tachysphex eurystoma Pulawski, sp. nov.

Figures 136, 137.

DERIVATION OF NAME.— *Eurystoma*, a combination of the Greek words *eurys*, short, and *stoma*, a mouth; with reference to the broad clypeus, one of this species' distinguishing characters.

RECOGNITION.— The female of *eurystoma* can be recognized by the combination of the short tarsi (e.g., length of foretarsomere II and of midtarsomere III about equal to apical width) and an unusually broad clypeus (distance between lip corners 1.6 × clypeal midlength, Fig. 136a). Subsidiary recognition features are: apical forebasitarsal margin emarginate (as in Fig. 54d), forebasitarsus with seven or eight rake spines (of which only the apical two have the sockets nearly contiguous), labrum with arcuate free margin, galea shorter than wide in profile, and pygidial plate densely punctate (most punctures less than one diameter apart). Females of *barkeri* and *brachypus* have a similar forebasitarsus and pygidial plate, but their clypeus is narrower (distance between lip corners 1.1–1.3 × clypeal midlength), the free margin of the labrum is obtusely pointed, and the galea is longer than wide in profile, mostly with a concave lateral surface.

The male of *eurystoma* resembles *barkeri* and *brachypus* in its unusual antennal proportions: the ventral margin of flagellomere I is slightly shorter than the apical margin, and flagellomere II is moderately elongate (dorsal length 1.2 × that of flagellomere I). Also, the midtarsus is slightly shortened (length of tarsomeres II and III 1.5–1.6 and 1.2 × apical width, respectively). In *eurystoma*, however, the clypeal lobe is broader (distance between lip corners 1.3 × clypeal midline, while about equal to midline in the other two), the galea is shorter than wide in profile (longer than wide), the forebasitarsus has two or three preapical rake spines (no spines or one such spine present), and the propodeal side is not ridged (also unridged in *brachypus*, but at least finely ridged in *barkeri*).

DESCRIPTION.— Scutal punctures small but well defined, averaging about 1–2 diameters apart in female, about one diameter in male; interspaces microsculptured. Mesopleural punctures averaging about two diameters at center; interspaces microsculptured, dull. Propodeal dorsum evenly microareolate; side dull, evenly microsculptured or shallowly punctate. Hindcoxal dorsum with inner margin carinate basally.

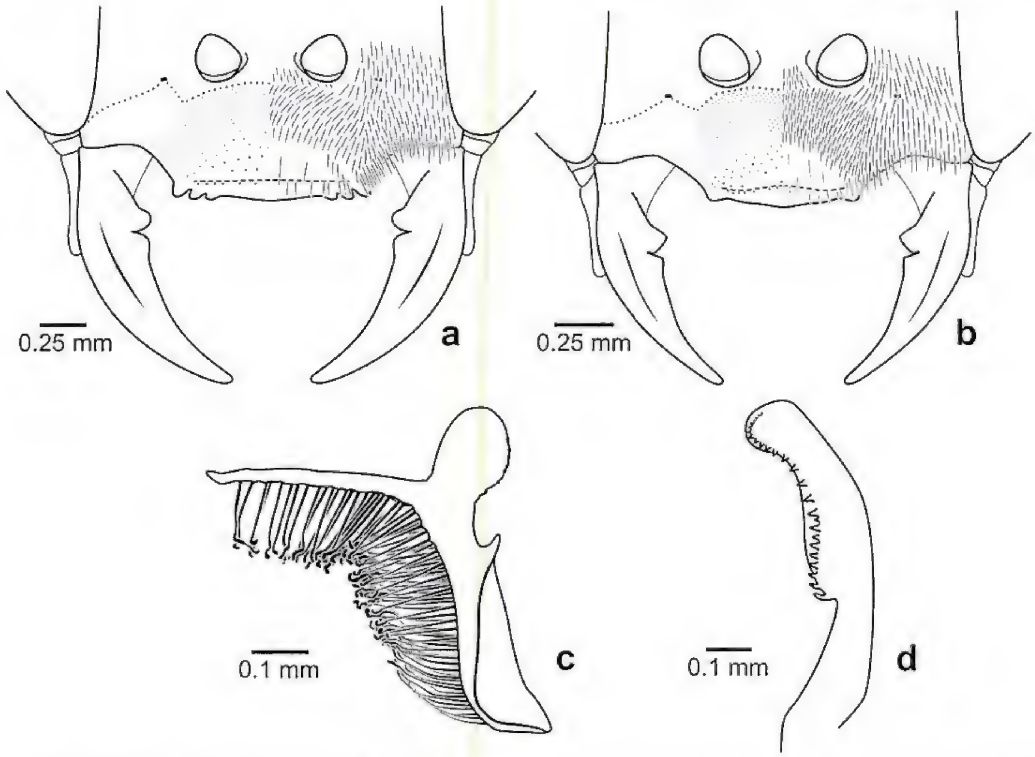

FIGURE 136. *Tachysphex eurystoma* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Setae erect on postocellar area and on each side of oral fossa next to occipital carina, about one midocellar diameter long; appressed on scutum; slightly, uniformly inclined posterad on propodeal dorsum; up to about one midocellar diameter on midfemoral venter.

Head, thorax, gaster, and legs black (including mandible), tarsal apex brown in male. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal and subcostal veins brown. Terga I–III silvery fasciate apically.

♀.— Labrum flat, free margin arcuate or shallowly emarginate mesally. Clypeus (Fig. 136a): lobe markedly broad (distance between lip corners about 1.6 × clypeal midlength); bevel slightly impressed, about as long as basomedian area; lip nearly straight mesally, with two well-defined lateral incisions on each side. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 1.4 × apical width. Foretibial dorsal surface and outer surface with a few, thin bristles; punctures of outer side on left leg averaging 2–3 diameters apart in one specimen. Tarsi short: length of fore- and midtarsomeres II about 1.1 and 1.3 × apical width, respectively; that of midtarsomere III equal to 0.9 of apical width; of fore-, mid-, and hindtarsomeres IV about 0.8, 0.8, and 0.9 × apical width, respectively. Forebasitarsus: apical margin with angulate emargination (as in Fig. 54d); outer margin with seven or eight rake spines (of which only apical two have their basal sockets subcontiguous); apical spines equal to basitarsus width. Apical tarsomeres stout, with one or two preapical spines on venter; lateral margins with one small spine near midlength (spine lacking on one or both sides in one specimen examined). Apical depression of tergum V punctate throughout except narrowly impunctate apicomesally. Pygidial plate narrow, slightly emarginate apically, surface with

numerous punctures, both large and small, many of which are less than one diameter apart (as in Fig. 54e). Length 9.3–9.6 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 136b): bevel shorter than basomedian area; free margin of lip almost straight mesally, with well-defined corner; distance between corners 1.3 × distance between corner and orbit. Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 1.3 × apical width, ventral margin shorter than apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with three or four rake spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomere II 1.5–1.6 × apical width, that of midtarsomere III 1.2 × apical width. Venter of apical tarsomeres with preapical spine (spine may be inconspicuous on some legs). Apical margin of sternum VIII at most slightly tridentate (median tooth, if present, markedly smaller than each of the lateral prongs). Length 7.5–8.2 mm. Volsella and penis valve: Figs. 136c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 137).— Eastern South Africa.

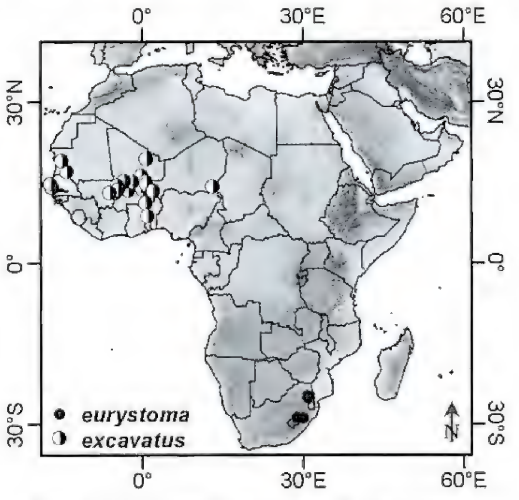

FIGURE 137. Collecting localities of *Tachysphex eurystoma* and *excavatus*.

RECORDS.— HOLOTYPE: ♂, **SOUTH AFRICA: Kwazulu-Natal**: Weenen, Feb 1925, H.P. Thomasset (BMNH). PARATYPES: **SOUTH AFRICA: Kwazulu-Natal**: Royal Natal National Park, H.K. and M. Townes, 25 Jan 1971 (2 ♂, AEI, CAS), 29 Jan 1971 (1 ♂, AEI). **Mpumalanga**: Bourkes Luck at 24°40′S 30°48′E, 28 Feb 1986, CDE (1 ♀; 1 ♀, 1 ♂, PPRI); Mac Mac Falls 10 km N Sabie at 25°02′S 30°48′E, 27 Feb 1986, CDE (1 ♂, PPRI).

Tachysphex excavatus Pulawski, sp. nov.

Figures 137–140.

DERIVATION OF NAME.— *Excavatus*, Latin for excavated; with reference to the deeply emarginate male forefemoral notch.

RECOGNITION.— *Tachysphex excavatus*, a West African species, has a convex labrum (protruding beyond the clypeal free margin) and an elongate galea (length equal to 0.7–0.8 of scape). It is further characterized by a densely punctate scutum (punctures inconspicuous, about one diameter apart), propodeal side uniformly microsculptured, the setae adjacent to the hypostomal carina straight and no longer than a midocellar diameter, appressed on the postocellar area and scutum, and oriented posterad on the propodeal dorsum apicomesally.

The female of *excavatus* closely resembles *incertus* and *dissimulatus* in having a laterally incised clypeal lip (Fig. 138a), an unsculptured apical depression of tergum V, and a setose outer foretibial surface. The females of the three species can be essentially identified by their different geographic ranges and association with the topotypical males. In *excavatus*, the propodeal side is unridged and the pygidial plate is narrow, whereas in some but not all *incertus* the propodeal side is ridged along the dorsal and posterior margins and the pygidial plate is broad (Fig. 192c). The two species may overlap in southern Sahara, but are largely separated geographically: *excavatus* occurs from Mauritania to Niger and Togo, whereas *incertus* range from the Mediterranean coast to southern Sahara (in addition to parts of Europe and Asia). I have not found any morphological difference

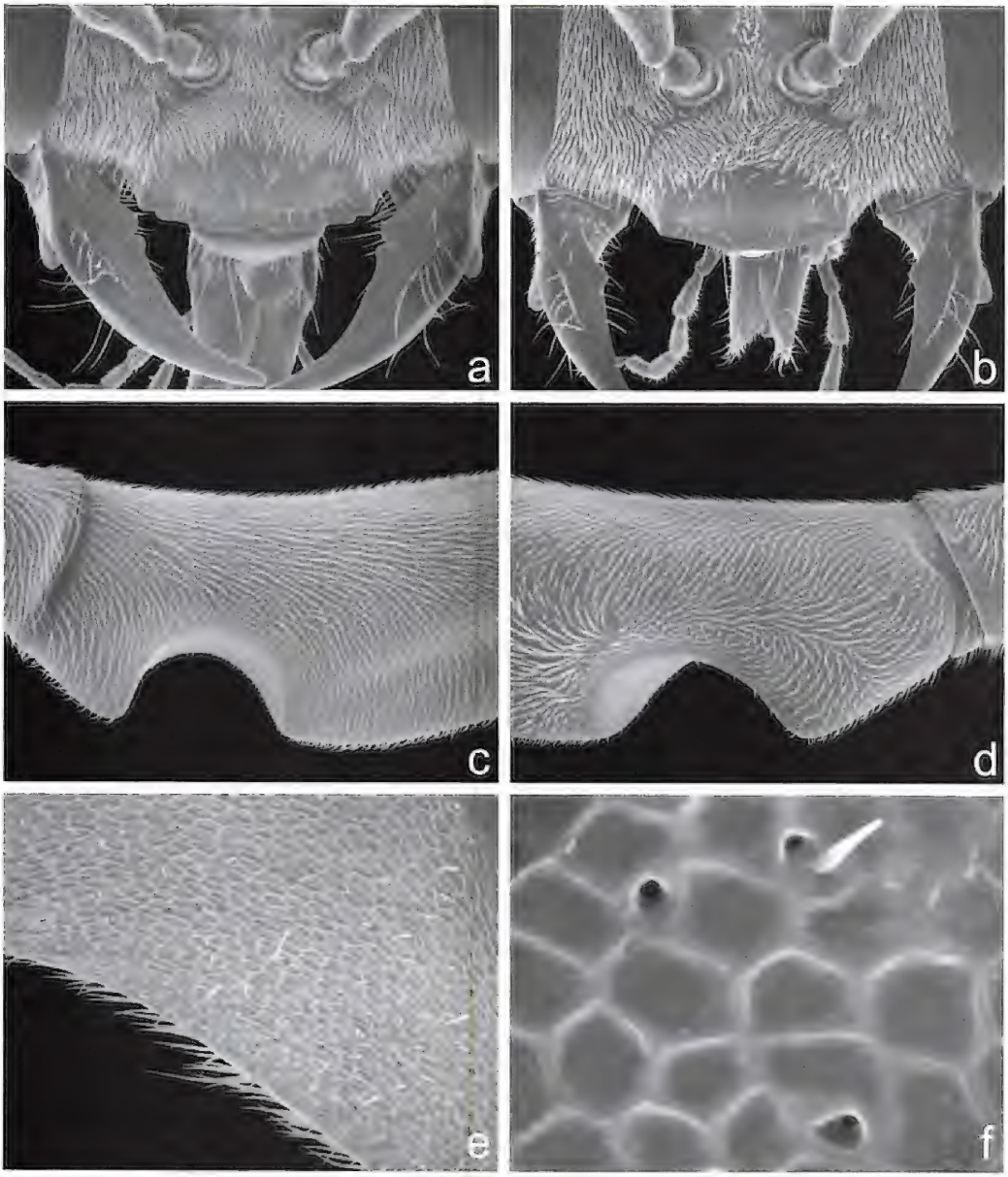

FIGURE 138. *Tachysphex excavatus* Pulawski, sp. nov.: a – female clypeus and mandible (×38); b – male clypeus and mandible (×90); c – base of male forefemur showing notch, anterior surface (×120); d – base of male forefemur showing notch, posterior surface (×120); e – surface of forefemoral notch in oblique view (×600); f – surface of forefemoral notch in flat view at a higher magnification, notice small pores on the surface (×3000).

between the females of *excavatus* and *dissimulatus*, which occurs in Zimbabwe, Botswana, Namibia, and South Africa.

The male has a unique, microscopically areolate bottom of the forefemoral notch (Figs. 138e, f), appearing uniformly mat under lower magnifications. Most males have the forefemoral notch

longer and deeper than average for the genus (Figs. 138c, d), but almost the usual size in some small specimens. A shallowly emarginate sternum VIII, broadly prominent mesally (Fig. 139), is also distinctive.

Description.— Labrum convex, markedly protruding beyond clypeal free margin. Galea densely, minutely punctate (except anteriorly), as long as 0.7 of scape in female, as 0.8 in male. Scutal punctures shallow, inconspicuous, about one diameter apart. Mesopleuron dull, evenly microsculptured. Propodeal dorsum and side evenly microareolate, posterior surface with inconspicuous ridges or not ridged. Hindcoxal dorsum with inner margin carinate basally or not carinate.

Setae appressed on postocellar area and scutum, nearly appressed and shorter than midocellar diameter on each side of oral fossa next to occipital carina, partly obscuring mesopleural integument in female, not obscuring in male, oriented toward midline on propodeal dorsum (obliquely anterad near base, obliquely posterad near apex) except oriented exactly posterad apicomesally.

Head black, mandible reddish except black in apical third (also basally in male), clypeal bevel red in many females. Setae golden on frons in female, silvery or golden in male; also scutal and scutellar setae golden in female. Thorax black in most specimens, but largely red in some females from Burkina Faso. Wing membrane slightly infumate to nearly hyaline; costal vein of forewing yellowish, subcostal vein dark brown. Color of legs and gaster: see below. Terga I–IV in female, I–III in male, silvery fasciate apically.

♀.— Clypeus (Fig. 138a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, incised laterally. Width of postocellar area about 1.1 × length. Dorsal length of flagellomere I 2.6–2.8 × apical width. Dorsal foretibial surface with one to three spines; outer surface with one to four spines. Forebasitarsus with 6–8 rake spines; foretarsomere II slightly elongate (length 2.0–2.2 maximum width). Apical spines of hindtarsomere IV reaching claw bases. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with punctures averaging many diameters apart, unsculptured between punctures, apex truncate or nearly so. Length 9.1–10.4 mm. Femora varying from all red to largely black (red are: forefemoral apex, midfemoral venter and apex, hindfemoral outer side and venter except basally). Tibiae red. Tarsi red to largely darkened. Gastral segments I–III red, remainder black, all red in some specimens from Burkina Faso.

♂.— Mandible: trimmal carina with tooth, mostly with cleft, but cleft absent in some specimens. Clypeus (Fig. 138b): bevel as long as basomedian area or longer; lip free margin arcuate, with well-defined, somewhat prominent corner; distance between corners 1.3–1.5 × distance between corner and orbit. Width of postocellar area 1.2–1.4 × length. Dorsal length of flagellomere I 1.5–1.8 × apical width. Forefemoral notch deeper and longer than average for the genus (Figs. 138c, d), but shallow in one small specimen (length 5.7 mm) from Nouakchott area, Mauritania; notch bottom microscopically areolate, sparsely setose and also with sparse pores (Figs. 138e, f). Outer margin of forebasitarsus with 1–5 rake spines, i.e., without preapical spines in some small specimens; outer apical spine of foretarsomere II as long as tarsomere III or longer. Hindmargin of sternum VIII shallowly emarginate, broadly prominent mesally (Fig. 139). Length 5.3–7.6 mm. Volsella and penis valve: Fig. 140. Femora black except apically (forefemoral anterior surface red in some specimens from Burkina Faso). Foretibia largely black (reddish near base and on outer surface); midtibia all red to black except reddish basally and apically; hindtibia black except reddish basally. Tarsi black to red. Gaster black in most specimens, but terga I and II reddish in some.

Geographic distribution (Fig. 137).— Mauritania to Niger and Togo.

Records.— Holotype: ♂, **SENEGAL**: Ndangane 45 air km SE Mbour, 26 July 1991, WJP (CAS). Paratypes: **BURKINA FASO**: 30 km SE Dori at 13°50.3′N 0°08.0′E, 30 July 2004, Sidiki Konaté and WJP (1 ♀); 1 km NE Gorom Gorom at 14°27.3′N 0°13.1′W, 29 July 2004, Sidiki Konaté and WJP (1 ♀); 15 km SE Gorom Gorom, 28 July 2004, Sidiki Konaté and WJP (1 ♀); 46 km S Kaya at 12°43.4′N 1°10.6′W, 19 July

FIGURE 139. *Tachysphex excavatus* Pulawski, sp. nov.: male sternum VIII.

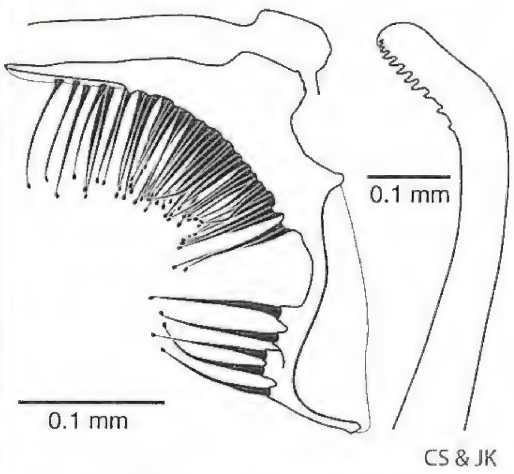

FIGURE 140. *Tachysphex excavatus* Pulawski, sp. nov.: volsella and penis valve.

2004, Sidiki Konaté and WJP (1 ♀); Kompienga 20 km S Pama, 1–16 June 1988, Sanborne, Landry, and Tou (1 ♀, 1 ♂; 7 ♀, 3 ♂, LEM); 4 km NW Ouahigouya at 13°37.0′N 2°27.6′W, 6–7 Aug 2004, Sidiki Konaté and WJP (1 ♀, 1 ♂); 23 km NW Ouahigouya at 13°43.1′N 2°35.3′W, 9 July 2004, WJP and M.H. Bourbin (1 ♀). **MALI**: Aguelhok, 26 Sept 1976, G. Popov (1 ♀, KMG); 40 km W Douentza, 19 Aug 1991, WJP (1 ♂); Gao, 29 Sept 1976, K.M. Guichard (2 ♀, KMG); Hombori, 12 Aug 1991, MS (1 ♂, MS); 10 km E Mopti, 7 Aug 1991, WJP (4 ♀, 4 ♂), 8 Aug 1991, MS (2 ♀, MS), 10 Aug 1991, WJP (2 ♀, 1 ♂); 130 km NE Mopti, 19 Aug 1991, MS (1 ♀, MS); 40 km W Mopti, 8 Aug 1991, MS (2 ♀, MS); 45 km W Mopti, 9 Aug 1991, WJP (1 ♀, 3 ♂); Ouatagouna, 7 Oct 1976, K.M. Guichard (1 ♀, KMG); 60 km NE San, 6 Aug 1991, WJP (1 ♂), 8 Aug 1991, MS (1 ♂, MS); 5 km S San, 3 Aug 1991, MS (1 ♀, MS); 20 km SW San, 22 Aug 1991, WJP (1 ♀); 40 km SE Ségou, 2 Aug 1991, MS (2 ♀, MS). **MAURITANIA**: Lake Aleg 30 km W Aleg, 28 Oct 1993, AM (1 ♀, MSNT), WJP (2 ♀, 2 ♂); 153 km NE Nouakchott, 26 Oct 1993, WJP (1 ♂). **NIGER**: **Diffa Region**: 12 km ENE Nguigmi at 14°18.9′N 13°13.2′E, 27 Aug 2005, WJP (1 ♂). **Niamey Region**: 8 km NW Niamey at 13°35.8′N 1°59.9′E, 3 Aug 2005, WJP (1 ♀). **Tillabéri Region**: Malalé 10 km E Niamey at 13°27.1′N 2°10.4′E, 4 Aug 2005, WJP (2 ♀); Tintatadat 10 km S Ayrou, 22 July 1978, R.A. Cheka (1 ♀, BMNH). **SENEGAL**: Bayakh 48 km E Dakar, 7 July 1991, WJP (1 ♂); Ndangane 45 air km SE Mbour, 26 July 1991, AM (1 ♀, 14 ♂, MSNT) and WJP (10 ♂); 3 km W Samba Dia (= 70 air km W Kaolack), 9 July 1991, WJP (1 ♀, 5 ♂), 17 July 1991, WJP (1 ♂); 5 km SW Thiès, 8 July 1991, WJP (1 ♂), 18 July 1991, AM (1 ♂, MSNT), WJP (1 ♀). **TOGO**: 12 km S Sokodé, 21 Feb 1991, WJP (3 ♂).

Tachysphex excisus Arnold

Figures 141–144.

Tachysphex dimidiatus de Saussure, 1892:483, ♂, junior secondary homonym of *Tachysphex dimidiatus* (Panzer, 1809), which is a junior synonym of *Tachysphex pompiliformis* (Panzer, 1805). Holotype: ♂, Madagascar: Toamasina Province: Anosibe (MHNG), examined. Tentatively synonymized with *Tachysphex excisus* by Menke *in* Bohart and Menke, 1976:273.— Leclercq, 1960:98 (Madagascar), 1961:111 (Madagascar).

Tachysphex dimidiatus var. *excisus* Arnold, 1945:104, ♀, ♂. Lectotype: ♂, Madagascar: Bekily (MNHN), **here designated**, examined.— Leclercq, 1960:198 (Madagascar).— As *Tachysphex excisus*: Menke *in* Bohart and Menke, 1976:273 (new status); Leclercq, 1990:117 (Madagascar); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

RECOGNITION.— *Tachysphex excisus* is the only Madagascan species with elongate mouth-

parts: the labrum convex and protruding from beneath the clypeus and the galea longer than wide in lateral view (Figs. 141a, b). The female differs from other such species by the combination of an all red gaster, uniformly microareolate propodeal dorsum and side, and the setae of the propodeal dorsum diverging anterolaterad on the median zone and oriented laterad next to the lateral maragin. The male is easily recognized by a conspicuous, setal fringe on each sternum V and VI, the fringes being markedly longer laterally than mesally (Figs. 141d–f). Similar fringes found in certain species of continental Africa (e.g., *aethiopicus* and *pentheri*) are about as long laterally as mesally. A subsidiary recognition feature, in the male, is the shape of the tooth on the trimmal carina (Fig. 141b).

Description (see also Dimorphic Males below).— Labrum convex, markedly protruding from beneath clypeus. Galea with minute punctures that are several diameters apart (interspaces unsculptured), as long as 0.8 of scape. Scutum minutely, uniformly punctate, with linear interspaces. Mesopleuron uniformly microareolate (Fig. 141c), as are propodeal dorsum and side (side minutely ridged near anterior margin in some specimens); transverse ridges of propodeal posterior surface evanescent in some specimens; upper metapleural pit oblong. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum; erect, about 0.3 × basal mandibular width on each side of oral fossa next to occipital carina; on propodeal dorsum diverging anterolaterad on median zone and oriented laterad next to lateral margin.

Head and thorax black, mandible yellowish red (except apically). Frontal setae silvery in females and most males, golden or with golden tinge in some males. Wing membrane almost hyaline to slightly infumate; forewing costal vein brown, subcostal vein dark brown. Femora: see Dimorphic Males below. Tibiae varying from mostly black (foretibial inner surface and hindtibial dorsum red) to all red. Tarsi black basally (apex reddish) to all red. Gaster mostly red, but segments IV–VIII brown in some males. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 141a): bevel about as long as basomedian area; lip free margin arcuate, emarginate mesally, incised laterally. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 2.2–2.6 × apical width. Dorsal foretibial surface with two spines; outer surface with one or two spines. Forebasitarsus with six or seven (mostly seven) rake spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that average several diameters apart, interspaces microareolate or unsculptured. Length 6.8–11.4 mm.

♂.— Mandible: trimmal carina with conspicuous, asymmetrical tooth (Fig. 141b) whose proximal margin is regularly curved and distal margin contrastingly straight or nearly so (forming right to obtuse angle with remaining carina); reduced distad of tooth (but contrastingly sharp preapically). Clypeus (Fig. 141b): bevel about as long as basomedian area, varying from shiny to dull (conspicuously microsculptured); lip free margin arcuate, minimally emarginate mesally, with well-defined corner; distance between corners 1.2–1.4 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemur either entire or with medium size notch (without intermediates); notch microscopically setose. Outer margin of forebasitarsus with 3–5 rake spines; outer apical spine of foretarsomere II as long as tarsomere III or longer. Sterna V and VI each with subbasal setal fringe that is longer laterally than mesally (Figs. 141d–f). Sternum VIII shallowly emarginate. Length 6.4–9.3 mm. Volsella and penis valve: Fig. 142

Dimorphic males and their status.— The forefemur is entire in most males of *excisus*, but emarginate in some specimens from southern Madagascar, without known intermediates. The color of the femora is largely correlated: in specimens without emargination, the femora are all black or the hindfemur is red apically (in some specimens, the red on the outer surface extends nearly to the femoral base); in emarginate specimens, the fore- and midfemora are partly red, and the hindfemur

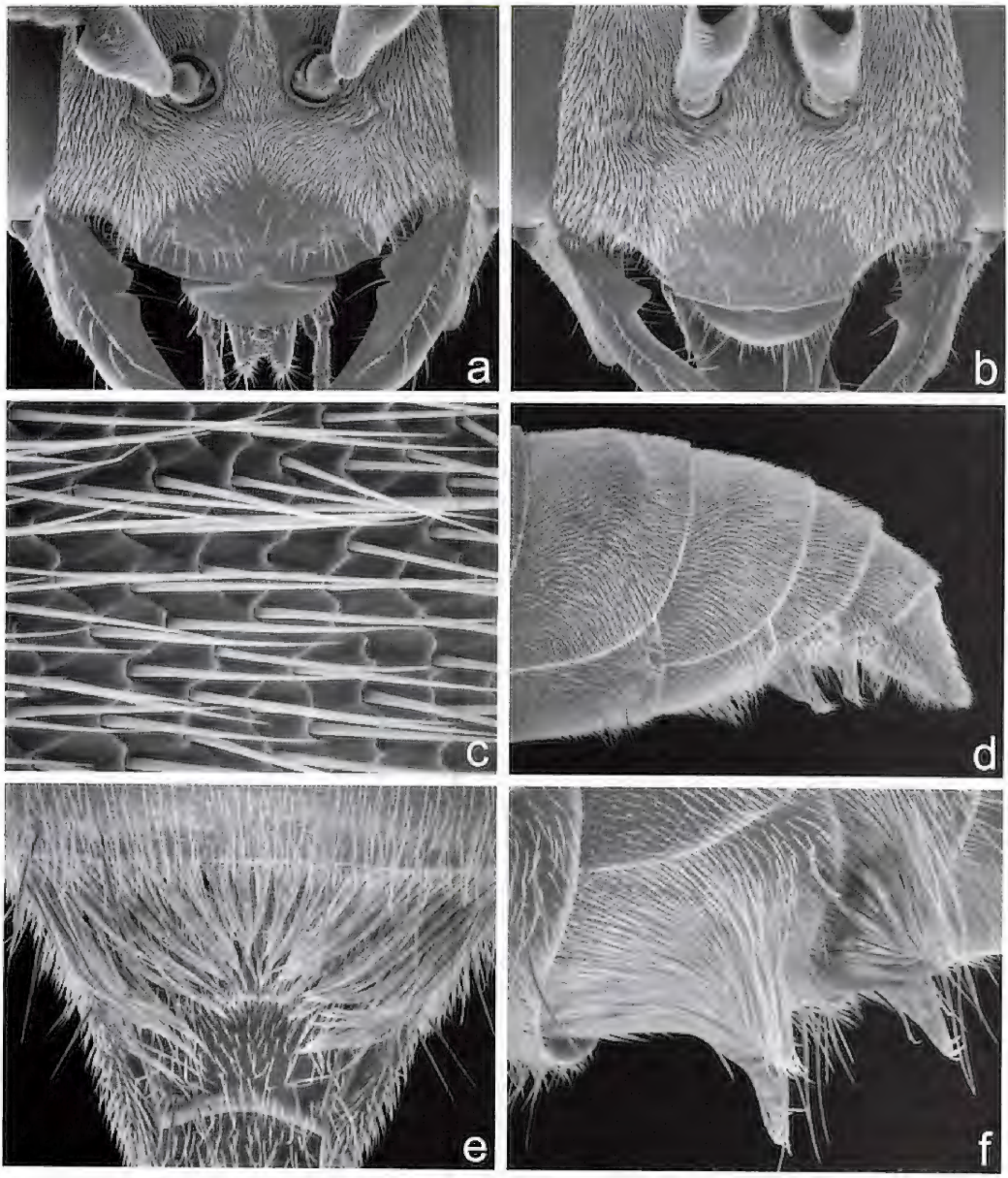

FIGURE 141. *Tachysphex excisus* Arnold: a – female clypeus and mandible (×42); b – male clypeus and mandible (×54); c – mesopleural sculpture (×1000); d – gastral segments III–VII of male in lateral view (×42); e – male sterna V and VI in ventral oblique view (×90); f – male sterna V and VI in lateral oblique view (×90).

is all red or black basally (up to one quarter of femoral length). Also, in specimens with an entire forefemur the sternal fringes are mostly dark brown but occasionally light brown; the fringes are light brown in emarginate specimens. Finally, the frontal setae are silvery except golden or with golden tinge in specimens with emarginate forefemora. All other characters are identical, including the genitalia.

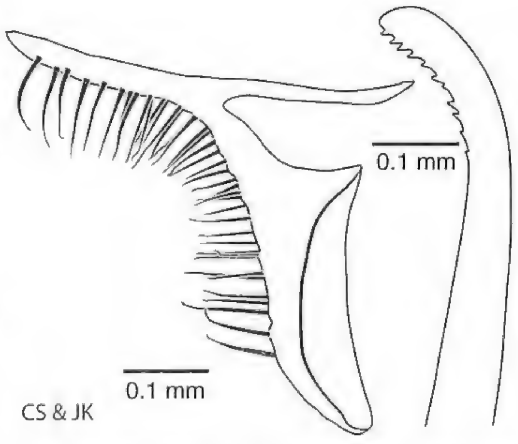

FIGURE 142. *Tachysphex excisus* Arnold: volsella and penis valve.

There are no morphological differences between females, and the hindfemur varies from all black to all red (except narrowly black basally). The two extreme color forms obviously correspond to the two male forms, but intermediate specimens cannot be assigned to one or the other.

Interpretation of these two male forms is problematic and only breeding experiments may definitely resolve their status. Generally in *Tachysphex*, the presence or absence of the forefemoral notch is a species level or group level character, although individually variable in *brevipennis* and *scopa*. Lack of intermediates suggests that two species are involved (Arnold, 1945:104; Menke *in* Bohart and Menke, 1976:273). The emarginate form, however, occurs together with the simple form, as if they were varieties of one species. My field observations revealed that the two forms were intermixed within the same habitat, with no behavioral differences. Structural homogeneity of females also speaks in favor of one species, and I feel that the two male forms as conspecific. The emarginate form, which also has more red on the legs and golden frontal vestiture, may be induced by some ecological factor.

HABITAT AND PREY.— Common in most sandy areas all over Madagascar. Grasshoppers are used as prey (Arnold, 1945).

GEOGRAPHIC DISTRIBUTION (Figs. 143, 144).— Madagascar.

RECORDS (the ♂ symbol refers only to males with entire forefemora, an *e* instead of sex symbol indicates males with emarginate forefemora).— **MADAGASCAR**: **Antananarivo**: Antananarivo (2 ♂, LB; 1 ♂, MHNB), Tsimbazaza Park in Antananarivo (Leclercq, 1990). **Antsiranana**: 1 km W Sakalava Beach (1 ♂). **Fianarantsoa**: Ihosy (1 ♂, MHNB), 84 km N Ihosy at 21°58′S 46°35′E (2 ♂), 40 road km W Ihosy at 22°28′S 45°49′E (3 ♀, 4 ♂), Isalo area at 22°38′S 45°20′E (1 ♀, 1 ♂; 1 ♂, MSNT), Isalo National Park at 22°36′S 45°10′E (12 ♀, 16 ♂; 4 ♂, MSNT), 6 km SE Namorona at 21.548°S 47.974°E (2 ♀, 1 ♂), Ranomafana National Park at 21°15.05′S 47°24.43′E (1 ♀), 10 km W Ranohira (2 ♀, 4 ♂). **Mahajanga**: Amborovy 8 km NE Mahajanga (2 ♀, 21 ♂), Marovoay (1 ♂, MHNB). **Toamasina**: Ambatondrazaka (1 ♀, 1 ♂, MRAC), Ampasimanolotra (as Brickaville): Ambila-Lemaitso (1 ♀, LB), Anosibe (1 ♂, MHNG, holotype of *dimidiatus*), Ivoloina (1 ♀, LB) Mahavelona (2 ♂, MRAC), Toamasina (6 ♂; 13 ♀, 23 ♂, MRAC, 2 ♀, 1 ♂, MSNT), 112 road km SW Toamasina (1 ♂). **Toliara**: 22 km E Ampanihy at 24°41′S 44°46′E (4 ♀, 8 ♂, 1 *e*; 1 ♂, MSNT), 3 km NW Ampanihy (3 ♀, 4 ♂, 1 *e*), Ankororoka (1 ♀, LB), Behara (Arnold, 1945; Leclercq, 1960, including *e*), Bekily (2 ♀, 2 ♂, 1 *e*, BMNH; 1 ♀, 1 ♂, MNHN, lectotype ♂ and paralectotype of *excisus*), Bereboka 60 km NE Morondava (1 ♀, BMNH), Berenty (17 ♀, 21 ♂; 1 ♀, 2 ♂, MSNT), Betioky (1 ♂, BMNH), Beza Mahafaly (4 ♀, KU), Ifaty 22 km N Toliara at 23°11′S 43°37′E (8 ♀, 7 ♂, 7 *e*; 1 ♂, MSNT), 38 km E Sakaraha (3 ♀, 8 ♂, 1 *e*; 1 ♀, 2 ♂, MSNT), Tolanaro at 25°02′S 46°57′E (1 ♂; 1 ♂, MHNB; 1 ♂, MSNT), Toliara (1 ♀, LB), 5 km N Toliara at 23°18′S 43°39′E (11 ♀, 19 ♂, 8 *e*; 1 *e*, MSNT), 10 km NE Toliara at 23°18′S 43°45′E (3 ♀, 7 ♂, 2 *e*; 4 ♀, 5 ♂, MSNT), 12 km SE Toliara at 23°25′S 43°45′E (25 ♀, 43 ♂, 5 *e*; 3 ♀, 6 ♂, MSNT), Toliara-Morombe (1 ♂, NHMW), Tongobory (2 *e*, BMNH). **Location unknown**: Ivondro, one of the three localities of this name (Leclercq, 1960, including *e*); no specific locality (1 ♂, BMNH; 4 ♂, MHNG, in de Saussure collection).

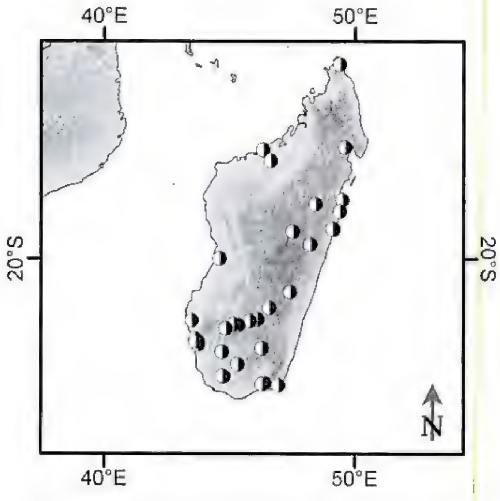

FIGURE 143. Collecting localities of *Tachysphex excisus* with entire male forefemur.

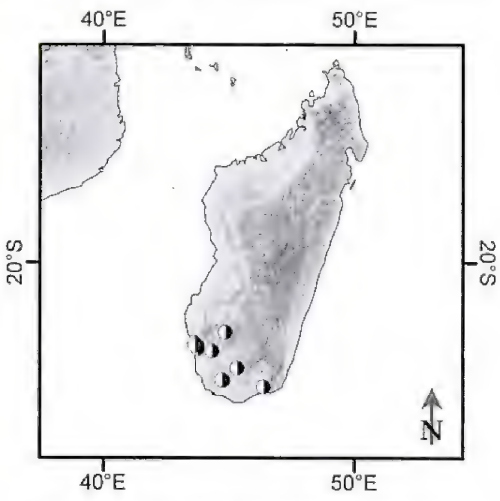

FIGURE 144. Collecting localities of *Tachysphex excisus* with emarginate male forefemur.

Tachysphex fasciatus Morice

Figures 145, 146.

Tachysphex fasciatus Morice, 1897:306, ♀. Holotype: ♀, Egypt: Zeitun near Cairo (OXUM), examined.— Honoré, 1942:55 (listed from Egypt); Bohart and Menke, 1976:273 (listed).— Nec de Beaumont, 1940:178, 1947a:207, and Pulawski, 1971:118 = *Tachysphex pseudofasciatus*.

TAXONOMIC HISTORY.— De Beaumont (1947a:208) examined the type of *fasciatus*, a headless female. I received this specimen for study in February 2004, with the head reglued to the body (the head appears to genuinely belong to the specimen). It is a species clearly different from what de Beaumont (1940, 1947a) and Pulawski (1971) called *fasciatus*. *Tachysphex fasciatus* of these two authors is here redescribed as a new species, *pseudofasciatus*.

RECOGNITION.— *Tachysphex fasciatus* has a flat labrum, not protruding beyond the clypeal free margin, mesopleural punctures minute, inconspicuous, hindwing vein cu-a vertical, propodeal dorsum and side evenly microsculptured, midfemur densely punctate, tarsi not abbreviate (midtarsomere II more than twice as long as wide, hindtarsomere IV markedly longer than wide), and setae appressed on midfemoral venter. The pygidial plate of the female is narrow apically.

The female of *fasciatus* (the male is unknown) differs from similar species in having an emarginate labrum in combination with a slightly, uniformly arcuate free margin of the clypeal lobe (without median emargination or lateral incision), and clypeal bevel shorter than basomedian area. The black gaster, combined with red femora, tibiae, and tarsi, is a subsidiary recognition feature.

DESCRIPTION (based on holotype only).— Scutal punctures fine, averaging about two diameters apart; interspaces shiny. Mesopleuron microsculptured, with minute, inconspicuous punctures. Propodeal dorsum and side evenly microsculptured; posterior surface not ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on vertex, about as long as midocellar diameter; sparse, suberect, on each side of oral fossa next to occipital carina, about equal to midocellar diameter; appressed on scutum; oriented anterad on propodeal dorsum.

Head, thorax, and gaster black, mandible reddish mesally. Frontal setae silvery in female. Wing membrane hyaline; costal and subcostal veins of forewing yellowish. Femora (except black

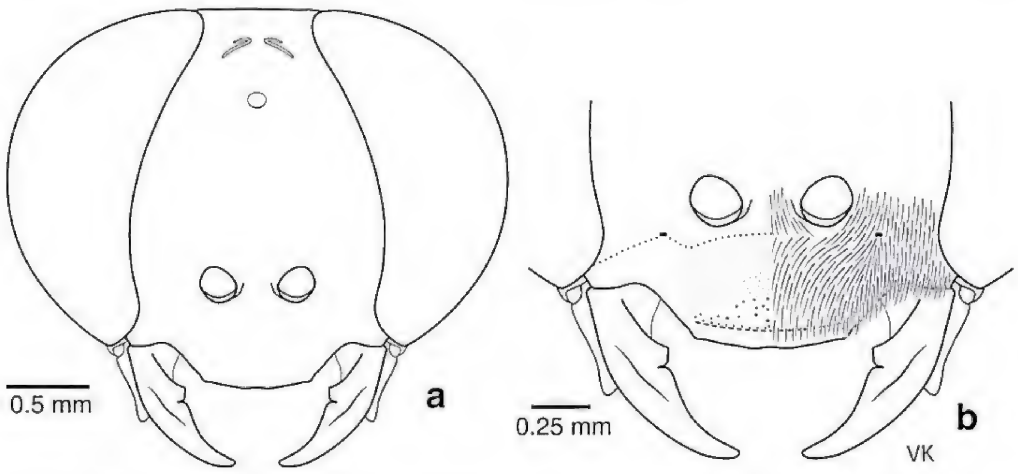

FIGURE 145. *Tachysphex fasciatus* Morice: a – female head in frontal view; b – female clypeus and mandible.

forefemoral base), tibiae, and tarsi red. Terga I–IV silvery fasciate apically, conspicuously so on terga I–III.

♀.— Labrum emarginate. Clypeus (Fig. 145b): bevel shorter than basomedian area; lip free margin slightly arcuate (almost straight), not incised laterally. Width of postocellar area 1.3 × length (Fig. 145a). Dorsal length of flagellomere I 1.8 × apical width; flagellomeres II–X lost. Foretibial outer surface with two and three spines, respectively. Forebasitarsus with nine rake spines. Apical tarsomeres with preapical bristle on venter. Tergum V with minute punctures that are several to many diameters apart, apical depression V impunctate, glabrous. Pygidial plate unsculptured except for a few, minute punctures that are many diameters apart. Length 9.0 mm.

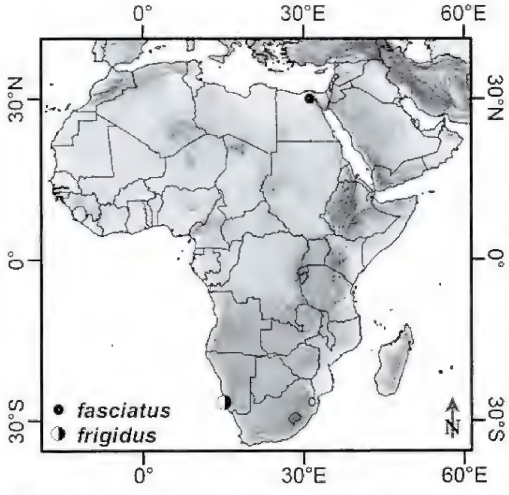

FIGURE 146. Collecting localities of *Tachysphex fasciatus* and *frigidus*.

♂.— Unknown

COLLECTING PERIOD.— The only known specimen was collected on 15 May 1896.

GEOGRAPHIC DISTRIBUTION (Fig. 146).— Egypt.

RECORDS.— **EGYPT**: **Al Qahira** (= Cairo): Zeitoun (1 ♀, OXUM, holotype of *fasciatus*).

Tachysphex flavofimbriatus Arnold, new status

Figure 147.

Tachysphex fluctuatus var. *flavofimbriatus* Arnold, 1945:97, ♂. Holotype: ♂, Madagascar: Bekily (MNHN), examined.— Leclercq, 1960:98 (Madagascar: Bekily).— As *Tachysphex fluctuatus flavofimbriatus*: Bohart and Menke, 1976:276 (new status, listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Tachysphex villosus Arnold, 1947:164, ♀. Holotype: ♀, Madagascar: Bekily (MNHN), examined. **New synonym.**— Bohart and Menke, 1976:277 (listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Recognition.— *Tachysphex flavofimbriatus*, an endemic of Madagascar, has the apical depression of sternum I intersected by a longitudinal carina, hindwing vein cu-a oblique (anal end further away from wing base than cubital end), setae sinuous on the head and thorax, and male sternum III with setae markedly longer apically than basolaterally. This combination is shared with *detritus* and *sericeus* (none of which occurs in Madagascar). The female of *flavofimbriatus*, however, has the mid- and hindtibiae all or partly black rather than all red (the tibiae are also black in exceptional specimens of *sericeus* from the Arabian Peninsula). The male differs from the other two species in having a nonemarginate forefemur, the setae on the apical depression of sternum III white, and the mid- and hindlegs all black (rather than all or partly red).

Justification of new synonymy.— The holotypes of *flavofimbriatus* and *villosulus* are opposite sexes of the same species. Their names are therefore synonyms.

Description.— Gena unusually narrow in dorsal view. Scutal punctures less than one diameter apart except, in many specimens, more than one diameter apart on disk. Mesopleuron dull, markedly microsculptured, with shallow, ill-defined punctures. Episternal sulcus complete in large specimens, incomplete in small ones. Propodeal dorsum longitudinally ridged or irregularly rugose posteriorly or with ridges partly evanescent; intersecting posterior face at about right angle; propodeal side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end further away from wing base than cubital end). Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Sternum I with apical depression that is bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae nearly appressed on scape, sinuous and erect (or nearly erect) on interocellar and postocellar areas, gena, and thorax; oriented posterad on propodeal dorsum (at least posteriorly); suberect on midfemoral venter. Setal length expressed as a fraction of basal mandibular width: 0.4–0.5 on postocellar area, 0.8–0.9 on each side of oral fossa next to occipital carina, about 0.6 on propodeal dorsum, about 0.2 on midfemoral venter.

Head, thorax, and gaster black, mandible reddish mesally. Frontal and clypeal setae silvery in female, golden in male. Wings nearly hyaline; forewing costal and subcostal veins dark brown or costal vein light brown. Legs all black except inner surface of foretibia reddish (only partly so in some males), but mid- and hindtibial venters red in some females (e.g., holotype of *villosus*). Terga I–IV in female, I–V in male, silvery fasciate apically.

♀.— Labrum with well-defined notch. Clypeus: bevel step-like, markedly shorter than basomedian area; lip free margin arcuate, emarginate mesally, with two lateral incisions on each side. Width of postocellar area about 0.8–0.9 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Dorsal foretibial surface with three spines; outer surface with three spines. Forebasitarsus with nine rake spines. Apical mid- and hindtarsomeres with one or two spines at midlength of each lateral margin and with cluster of preapical spines on venter. Apical depression of tergum V impunctate, glabrous. Length 10.0–11.5 mm.

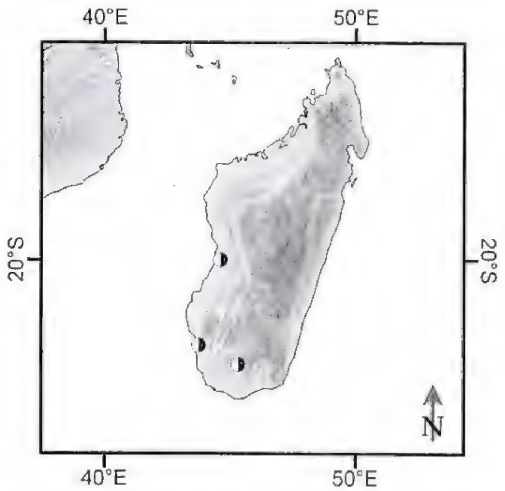

Figure 147. Collecting localities of *Tachysphex flavofimbriatus*.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel absent; free margin of lobe arcuate or slightly sinuate, with well-defined corner; distance between corners about 1.2 × distance between corner and orbit. Width of postocellar area about 0.4 × length. Dorsal length of flagellomere I 1.8 × apical width. Forefemur not emarginate. Outer margin of forebasitarsus with 1–3 short rake spines, i.e., without preapical spines in some specimens; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Sternum II with suberect setae; those on apical depression denser but not longer than on remaining surface. Apical depressions of sterna III and IV with subappressed setae that are markedly longer than on remaining surface (setae of sternum III white, appearing agglutinated apically). Length 9.5–10.0 mm. Volsella and penis valve as in *costae* (Figs. 102b, c).

GEOGRAPHIC DISTRIBUTION (Fig. 147).— Southern and central Madagascar.

RECORDS.— **MADAGASCAR: Toliara:** Bekily (1 ♀, 3 ♂, MNHN, including holotypes of *villosus* and *flavofimbriatus*; 1 ♀, SAM, paratype of *villosus*), Bereboka 60 km NE Morondava (1 ♀, BMNH), 12 km SE Toliara at 23°25′S 43°45′E (1 ♀, 5 ♂).

Tachysphex frigidus Pulawski, sp. nov.

Figures 146, 148.

DERIVATION OF NAME.— *Frigidus*, Latin masculine adjective for frigid; with reference to the cold habitat where the specimens were collected.

RECOGNITION.— *Tachysphex frigidus* has a labrum convex and protruding beyond the clypeal free margin, an elongate galea (length equal to 0.9–1.1 of scape), the propodeal dorsum all setose, with setae diverging obliquely anterad from the midline, the propodeal side ridged (only anteriorly in some specimens), and the upper metapleural pit oblong. In addition, scutal punctures are well defined (interspaces unsculptured or microsculptured); setae are straight on the head, appressed on the postocellar area and no longer than one midocellar diameter. In the male, sterna IV–VI have a subbasal, erect fringe of agglutinated setae (the fringes are visible only when the segments are fully extended).

The female resembles *aethiopicus*, *melanius*, *miniatulus*, *rotundus*, *ruber*, and *usakos* in having foretarsomeres I and II slightly broadened apicolaterally, with the lateral margin expanding over the bases of the rake spines (as in Figs. 9c, e). Unlike these species, the middle clypeal section is longer in *frigidus* (distance between antennal socket and lip free margin about 1.0 × distance between lip corners, rather than 0.7 × or nearly so).

In the male, the carina emerging from the clypeal lip corner is well defined and extends well beyond the lip at least as an obtuse swelling (best visible in oblique lateral view), the carinae markedly diverging upward; the clypeus is long (distance between antennal socket and lip free margin 1.2–1.3 × distance between lip corners); and the mandible is elongate (Fig. 148b). Unlike *aethiopicus*, *montivagus*, and *pentheri*, sternum IV has a basal fringe of agglutinated setae. Unlike most *pentheri*, the apical prong of sternum VIII is not incised on the inner margin.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea with minute, sparse punctures, its length equal to about 0.9 × of scape in female, about 1.1 × in male. Scutal punctures well defined, most punctures on disk 2–3 diameters apart. Mesopleuron areolate, in female and some males with minute punctures that are 2–3 diameters apart under scrobe (punctures practically reduced in most males). Propodeal dorsum microscopically rugose; side ridged, only anteriorly so in some specimens; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect on each side of oral fossa next to occipital carina, slightly shorter than midocellar diameter; appressed or nearly so on postocellar area, appressed on scutum; diverging obliquely

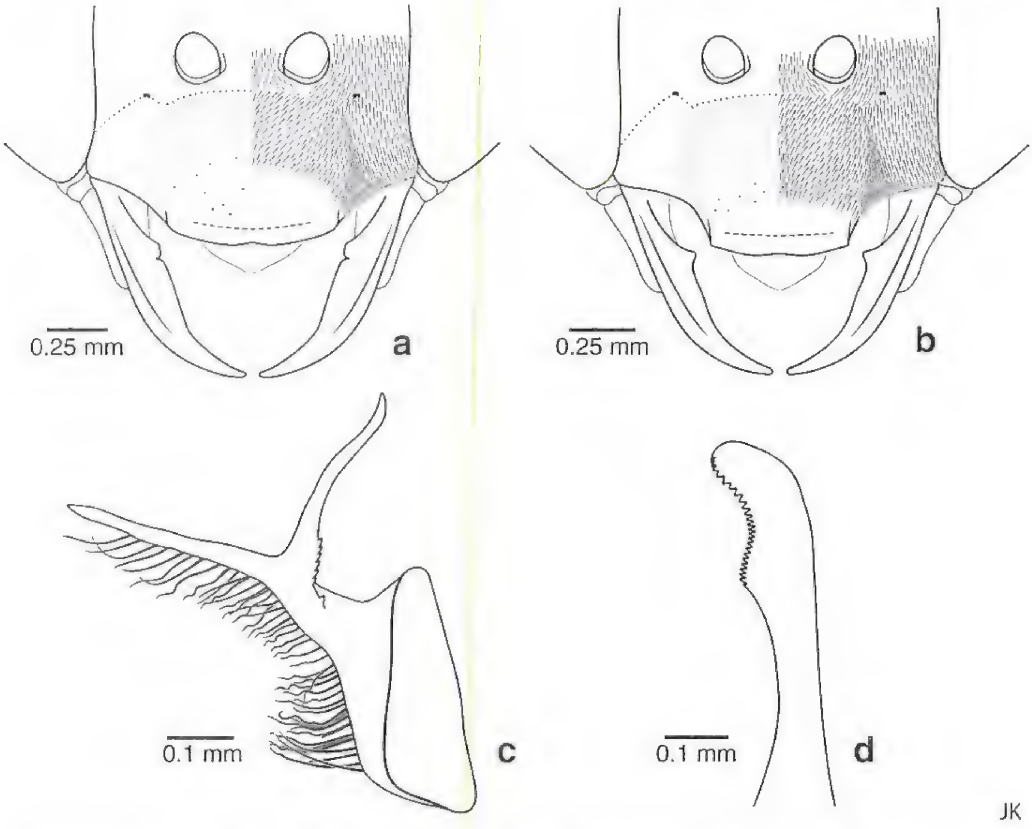

FIGURE 148. *Tachysphex frigidus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

anterad from midline on propodeal dorsum.

Head and thorax black, mandible (except apically) and clypeal lip and bevel reddish brown (mandible largely darkened basally and clypeus all black in several males). Frontal setae silvery in both sexes. Wing membrane nearly hyaline; costal and subcostal veins of forewing light brown. Femora either all black (many males) or red in apical half or so; tibiae varying from all red (females, some males) to all black (some males). Gaster in female partly red, largely irregularly darkened, with at least reddish preapical area on terga I–V (tergum II all red in one specimen, terga nearly all black in another), in male all black or with some red on tergum I, apical depressions of terga translucent. Terga I–III silvery fasciate apically, fasciae practically absent in males from Agate Bay.

♀.— Mandible: trimmal carina with low, somewhat rounded tooth (Fig. 148a). Clypeus (Fig. 148a): bevel longer than basomedian area; lip free margin arcuate, shallowly emarginate mesally, neither incised nor sinuous laterally. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.7 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with 6 or 7 rake spines. Foretarsomeres I–III slightly expanded apicolaterally over bases of rake spines (as in Fig. 9c). Apical depression of tergum V punctate and setose. Pygidial plate aciculate basally, unsculptured apically, with minute punctures that are many diameters apart. Length 8.8–9.2 mm.

♂.— Mandible elongate, trimmal carina with tooth, without cleft (Fig. 148b). Clypeus (Fig.

148b): bevel longer than basomedian area; lip free margin straight to arcuate, with well-defined corner, with obtuse ridge extending from corner; distance between corners 0.9–1.1 × distance between corner and orbit. Width of postocellar area 0.9–1.3 × length. Dorsal length of flagellomere I 2.1–2.3 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Punctures of tergum VII up to two or three diameters apart mesally. Sterna IV–VI (except laterally) each with subbasal, erect fringe of agglutinated setae (fringes visible only when segments are fully extended). Length 6.0–7.3 mm. Volsella and penis valve: Figs. 148c, d.

Geographic distribution (Fig. 146).— Southwestern Namibia.

Records.— Holotype: ♀, **NAMIBIA**: **Lüderitz District**: Grosse Bucht at 26°41′S 15°10′E, 29 Feb 2000, visiting flowers of *Zygophyllum clavatum* Schltr. and Diels, FSG (AMG). Paratypes: **NAMIBIA**: **Lüderitz**: same data as holotype (4 ♂; 4 ♂, AMG); Lüderitz to Agate Beach at 26°37′S 15°11′E, 29 Feb 2000, visiting flowers of *Zygophyllum clavatum* Schltr. and Diels, FSG (1 ♀, 1 ♂; 2 ♀, 1 ♂, AMG).

Tachysphex fugax (Radoszkowski)

Figures 149–152.

Tachytes fugax Radoszkowski, 1877:30, ♂. Holotype: ♂, Uzbekistan: Samarkand (ZMMU), examined before 1971.— Dalla Torre, 1897:690 (in catalog of world Hymenoptera); de Beaumont, 1936b:619 (interpretation of the species).— As *Tachysphex fugax*: Kohl, 1885:394 (tentatively new combination, original description copied); Pulawski, 1971:178 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:8 (Israel); Erlandsson, 1974:71 (Malta); Frilli and Pizzaghi, 1975:76 (Italy); Bohart and Menke, 1976:273 (listed); Báez and Ortega, 1978:192 (Canary Islands); Kazenas, 1978:122, 132 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:218, 221 (in key to Sphecidae of European USSR); Guichard, 1980:227 (Oman); Pagliano, 1980:127 (Italy); Gess, 1981:19 (South Africa, nest, prey); Rodgers and Homewood, 1982:233 (Tanzania); Schmidt and Westrich, 1983:123 (Greece); Gayubo, 1984a:84 (Spain), 1985a:168 (Spain), 1985b:487 (nest); Scobiola-Palade, 1985:96 (Romania); Gayubo, 1986a:33 (Spain); Gayubo and Heras, 1986:40 (Spain); Gayubo and Sanza, 1986:44 (Spain); Hensen and van Ooijen, 1987:12 (Turkey); Gayubo and Mingo, 1988:78 (Spain); Dollfuss, 1990:122 (Central African Republic); Gayubo, Asís, and Tormos, 1990:17 (Spain); Pagliano, 1990:103 (in catalog of Italian Sphecidae); Gayubo, Borsato, and Osella, 1991:402 (Italy); Gayubo and Torres, 1991:81 (Spain); Schembri, 1991:180 (Malta); Hohmann, La Roche, Ortega, and Barquín, 1993:233 (Canary Islands); Luchetti, 1993:106 (Italy); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Gayubo and Borsato, 1994:207 (Italy); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula); Tormos, Asís, and Gayubo, 1994:188, 204 (Spain); Gorobchishin, 1995:18 (Ukraine); Negrisolo, 1995:23 (Italy); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Gorobchishin, 1996:53 (Ukraine); Gusenleitner, 1998:498 (Austria); Gayubo, García, Torres, and González, 1999:89 (Spain); Gonzáles, Gayubo, and Torres, 1999:335 (Spain); Shkuratov, 2000:58 (Russia: Rostov Oblast'); Kazenas, 2001:28 (in checklist of Sphecidae of Kazakhstan and Central Asia); Schmidt and Bitsch *in* Bitsch et al., 2001:249 (in Sphecid Fauna of Western Europe); Kazenas 2002:67 (Kazakhstan); Gayubo, Özbek, and Yildirim, 2003:89 (Turkey); Generani, Pagliano, Scaramozzino, and Strumia, 2003:65 (Italy); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex filicornis Kohl, 1883a:169, ♀. Lectotype: ♀, France: Marseille (NHMW), designated by Pulawski, 1971:181, examined before 1971. Synonymized with *Tachysphex fugax* by Pulawski, 1971:178.— Kohl, 1883c:670 (incorrectly recorded from Switzerland), 1885:369 (in revision of Mediterranean *Tachysphex*); Bingham, 1898:104 (Yemen); Ferton, 1901b:680 (found in Marseille area, France, but not in Corsica); Antiga and Bofill, 1904:10 (in catalog of Catalonian Hymenoptera); Saunders, 1904:604 (Mayorca); de Gaulle, 1908:121 (listed from France); Mercet, 1910:165 (listed from Spain); Graeffe, 1911:45 (Italy); Morice, 1911:101 (Algeria); Dusmet, 1915:87 (Spain); R. Turner, 1917a:321 (Ethiopia); Arnold, 1923:159 (redescription), 1924:57 (South Africa, variation); Berland, 1925:118 (in Sphecid Fauna of France); Grandi, 1928b:14 (Italy); Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bernard, 1933:62

(France); Nadig, 1933:79 (Morocco); Giner Marí, 1934:133 (Spain); Bernard, 1935:64 (France); de Beaumont, 1936a:208 (in revision of French *Tachysphex*); Giordani Soika, 1939:73 (Italy); de Beaumont, 1940:176 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); Giner Marí, 1943a:137 (in Sphecid Fauna of Spain); de Beaumont, 1947a:201 (in revision of Egyptian *Tachysphex*); Zavadil and Šnoflak, 1948:148, 152 (in key to Czechoslovak Sphecidae); de Andrade, 1949:15 (Portugal); de Beaumont, 1950a:406 (Algeria); Heldmann, 1953:112 (incorrectly recorded from Germany; see Schmidt, 1969); de Beaumont, 1954a:60 (Italy), 1954b:91 (Italy); Grandi, 1954:179 (nesting habits), 239 (Italy); de Beaumont, 1955:184 (Morocco); Steiner, 1955:138 (France); Vogrin, 1955:37 (Croatia); Ceballos, 1956:376 (listed from Spain); Morel, Nouvel, and Ribaut, 1956:338: (France); Grandi, 1957:389 (Italy: Sardegna); Nouvel and Ribaut, 1958:13 (France); Compte Sart, 1959:133 (Spain: Mallorca); de Beaumont, 1959:29 (Italy); Diniz, 1959:29 (Portugal); Suárez, 1959:58 (Spain); Wolf, 1959:24 (Heldmann's record from Germany is doubtful); Grandi, 1961:201 (nesting habits); de Beaumont, 1962:26 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Diniz, 1964:29 (Portugal); de Beaumont, 1965:50 (Greece); Balthasar, Hrubant, and Hrubant, 1967:171 (Bulgaria); de Beaumont, 1967:509 (South Africa), 1968:263 (Canary Islands); Schmidt, 1969:164 (Heldmann's record from Germany actually refers to *Tachysphex nitidus*); Simon Thomas, 1969:120 (Canary Islands); Zangheri, 1969:1704 (Italy); Königsmann, 1971:106 (Spain); Simon Thomas, 1972:182 (France); Báez and Ortega, 1978:192 (Canary Islands); Dollfuss, 1989:13 (lectotype in NHMW).

Tachysphex micromegas de Saussure, 1892:481, ♀, ♂. Lectotype: ♀, Madagascar: no specific locality (MHNG), **here designated**, examined. **New synonym**.— Dalla Torre, 1897:681 (in catalog of world Hymenoptera); R. Turner, 1911b:370 (Seychelles Islands); Arnold, 1945:102 (redescription); Leclercq, 1960:98 (Madagascar, comparison with *Tachysphex perniger*), 1961:111 (Madagascar); Bohart and Menke, 1976:274 (listed); Leclercq, 1990:118 (Madagascar: locality records); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Tachysphex sikorae de Saussure, 1892: pl. 27, fig. 2 (as *Sikorae*, incorrect original capitalization). Objective synonym of *Tachysphex micromegas*. Synonymized with *Tachysphex micromegas* by Menke (first reviser) *in* Bohart and Menke, 1976:274.

Tachysphex filicornis excerptus R. Turner, 1917a:321, sex not indicated. Holotype or syntypes: Zimbabwe: Salisbury, now Harare (BMNH), examined. Synonymized with *Tachysphex filicornis* by Arnold, 1923:160 ("can hardly be maintained").— As *Tachysphex fugax excerptus*: Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex fugax* is one of the many species in which the gaster, femora, and tibiae are all black; the labrum is flat and concealed beneath the clypeus; the mesopleuron has well-defined punctures and shiny interspaces; the setae are erect on the postocellar area, nearly erect on the scutum and midfemoral venter (as in Figs. 97c, d), and inclined obliquely anterad on the propodeal dorsum; and the tarsi are not modified (length of midtarsomere II more than twice apical width, that of tarsomeres IV more than apical width, apical tarsomeres not angulate basoventrally, without spines on venter or lateral margins).

There is no single character by which all *fugax* can be distinguished from all other such species, but specimens from continental Africa and Eurasia have an unusually long antenna. Length of flagellomere IV, e.g., is 4.0–4.5 × apical width in the female (Fig. 149e) and 2.2–2.8 in most males (Fig. 149f), but 1.8–2.0 in some males. In most other species, these ratios are 3.5–3.6 or less in the female, and less than 2.0 in the male. The long flagellomeres are diagnostic for these populations of *fugax* in combination, in the female, with a flat middle clypeal section and at most a rudimentary bevel, and in the male a clypeus without a bevel but with a well-defined lip corner (Figs. 149b, d) and an asetose, dull, microscopically rugose bottom of the forefemoral notch (Figs. 150a, b). In addition, only terga I–III are silvery fasciate apically, and the outer apical spine of male foretarsomere II is no longer than tarsomere III (Fig. 149g). The punctatorugose frons is a subsidiary recognition feature.

In the Malagasy and Comoro populations, female flagellomeres are slightly shorter and thus

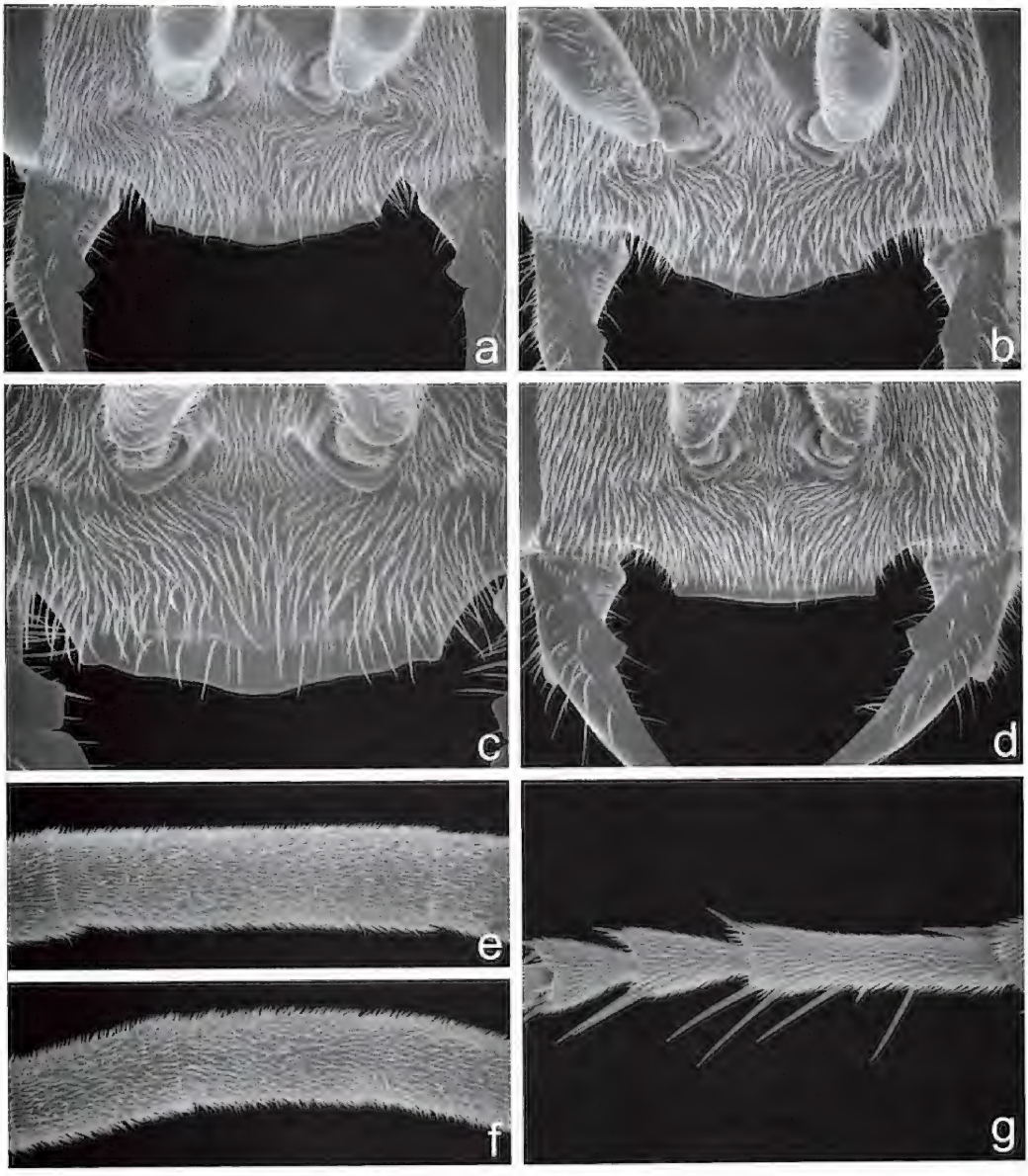

FIGURE 149. *Tachysphex fugax* (Radoszkowski): a – clypeus of female from continental Africa (×41); b – male clypeus with arcuate lip margin (×63); c – median portion of female clypeus (×120), specimen from Madagascar; d – male clypeus with straight lip margin (×54); e – female flagellomere IV (×90), specimen from continental Africa; f – male flagellomere IV and portions of two adjacent ones (×90); g – male foretarsomeres I–III (×70).

not diagnostic (length of flagellomere IV is 2.8–3.2 × apical width). Specimens differ from other Malagasy and Comoro *Tachysphex* in having a combination of well-defined scutal and mesopleural punctures, erect setae of the postocellar area, female clypeal lip without lateral incision, and male clypeal lip with a prominent corner.

JUSTIFICATION OF NEW SYNONYMY.— *Tachysphex micromegas* is known from Madagascar and

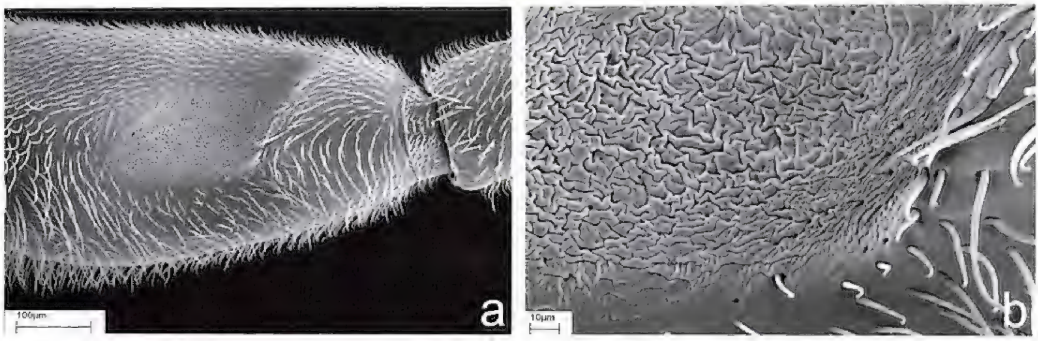

FIGURE 150. *Tachysphex fugax* (Radoszkowski): a – base of male forefemur in ventral view showing notch; b – bottom of forefemoral notch, higher magnification.

the Comoros, and *fugax* from the continental Africa, southern Europe, and southwestern Asia. They intergrade in nearly all morphological structures. For example, most Madagascan females have a short but well-defined clypeal bevel, an apparent difference from *fugax*. In some Madagascan females, however, the bevel is rudimentary or absent, as in the typical *fugax*. The only gap is that the female antenna is slightly shorter in *micromegas*, as discussed under Recognition above. This difference does not suggest reproductive isolation, and I regard the two taxa as geographic forms of one species.

RELATIONSHIPS TO *TACHYSPHEX MOROSUS*.— *Tachysphex morosus* (F. Smith, 1858) closely resembles *fugax* except that the male antenna averages shorter (the length is the same in some specimens). Possibly, they are merely geographic forms of one polytypic species (lack of records from intermediate territories almost certainly results from inadequate collecting). *Tachysphex fugax* occurs in the Afrotropical and Palearctic Regions (Africa, southern Europe, east to Tajikistan), whereas *morosus* is found in the Oriental Region and Oceania (from Sri Lanka, Sumatra, and New Guinea in the south to Nepal, Sichuan Province of China, and Taiwan in the north, and to Micronesia, Fiji, and Hawaii in the east; see Krombein and Pulawski, 1994:24, for locality records).

DESCRIPTION.— Frons punctatorugose. Scutal and mesopleural punctures well defined, on scutum either less than one diameter apart or many discal punctures up to 2–3 diameters apart, at center of mesopleuron less than one to about two diameters apart; interspaces shiny. Episternal sulcus complete. Propodeal dorsum irregularly rugose, side ridged. Hindcoxal dorsum with inner margin carinate, carina low to expanded basally.

Setae (figures in parentheses refer to setal length expressed as a fraction of basal mandibular width): erect on postocellar area (0.4–0.5 in most specimens, 0.2–0.3 in specimens from Aldabra) and on each side of oral fossa next to occipital carina (0.5–0.7), slightly inclined posterad on scutum mesally (0.4–0.5 anteriorly, 0.3–0.5 in Madagascan females); inclined obliquely anterad on propodeal dorsum.

Body black; mandible reddish mesally in many specimens; apical tarsomeres black or brown. Frontal setae silvery in both sexes, with golden tinge in upper part in some sub-Saharan males. Wing membrane infumate, slightly so in some specimens; forewing costal and subcostal veins almost black. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 149a): bevel rudimentary or absent except short bevel present in most Malagasy specimens (Fig. 149c); lip free margin arcuate or obtusely pointed mesally, not incised laterally. Width of postocellar area 1.8–1.9 × length. Dorsal length of flagellomere I 2.6–3.7 × apical width. Dorsal foretibial surface with a few fine bristles; outer surface with one long, thin spine near midlength. Forebasitarsus with 5–7 rake spines. Apical depression of tergum V varying from

impunctate to punctate throughout. Pygidial plate aciculate, with minute, sparse punctures. Length 7.0–10.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Figs. 149b, d): bevel absent; lip free margin arcuate, corner well defined, prominent in some specimens; distance between corners 1.0–1.3 × distance between corner and orbit. Width of postocellar area 1.9–2.2 × length. Dorsal length of flagellomere I 1.1–1.8 × apical width, equal to about 0.7 of flagellomere II. Length of flagellomere IV varying (see Variation below). Forefemoral notch asetose, microscopically rugose, dull (Figs. 150a, b). Outer margin of forebasitarsus with 3–5 rake spines in most specimens (Fig. 149g), but with only the apical spine in some (see Variation); outer apical spine of foretarsomere II varying from about as long as tarsomere III to markedly shorter. Tergum VII densely punctate throughout or punctures largely reduced. Length 5.0–8.0 mm. Volsella and penis valve: Fig. 151.

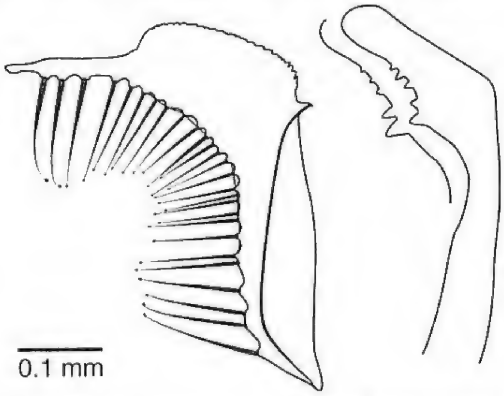

FIGURE 151. *Tachysphex fugax* (Radoszkowski): volsella and penis valve.

GEOGRAPHIC VARIATION.— Various populations of *fugax* differ in the size of the hindcoxal tooth, size of the female clypeal bevel, setae of female antenna, and length of the male antenna and male foretarsal rake, as described below.

Hindcoxal dorsum: inner carina somewhat expanded basally in most populations, but expanded into a basal tooth in most specimens from the Balkan Peninsula, Turkey, Syria, and Israel.

Female clypeal bevel: rudimentary or absent in most populations, but present in most Malagasy females, up to about two midocellar diameters long mesally (Fig. 149c).

Female antenna: antennal microsetae usual in most specimens, but contrastingly dense on the outer surface of four apical flagellomeres in females from Italy, southwestern Europe, and Morocco.

Male flagellomere III: dorsal length equal to about 0.9 of flagellomere IV in most specimens (0.8 in those from Kenya), but 0.6–0.8 in males from the Balkan Peninsula, Turkey, Syria, Israel, some from Egypt (Aswan only), one male collected 16 km N Moyale, Ethiopia, and 0.7–0.9 in males from Madagascar.

Male flagellomere IV: dorsal length 2.2 × apical width or more in most specimens, but 1.8–2.0 × in males from the Balkan Peninsula, Turkey, Syria, Israel, United Arab Emirates, the male from the Moyale area mentioned above, and 1.9–2.2 in males from Madagascar.

Male foretarsomere I: outer margin with 3–5 rake spines in most specimens, but with one or two in some (one subbasal, one apical), and without preapical spines in some from Israel and Kenya and most from Madagascar and Comoro. The number of spines may vary individually, e.g., one preapical spine is present on one leg and no spines on the other.

Male foretarsomere II: outer apical spine about as long as foretarsomere III in most specimens, but markedly shorter in specimens from Balkan Peninsula, Turkey, Syria, Israel, United Arab Emirates, and also Madagascar (only slightly longer than inner apical spine).

NESTING BEHAVIOR.— Nests are established in friable soils such as sand or clay, either in flat sites (Gess, 1981; Gayubo, 1985b) or in vertical cliffs (Grandi, 1954, 1961). There are one or two cells per nest, and the entrance is almost certainly open during the provisioning period (Grandi). Prey consist of grasshoppers, both adults and nymphs, that are flown to the nest. They are stored venter up, several per cell. Grandi could not determine the prey because of their early stage, and

Gess found adult and nymphal Lentulidae (some of which are *Eremidium* sp., pers. comm.); additionally, several females from Lesotho and South Africa are pinned with their prey, nymphal acridids (det. F.W. Gess). The wasp's egg is positioned transversally on the grasshopper venter, just behind the forecoxae (Grandi).

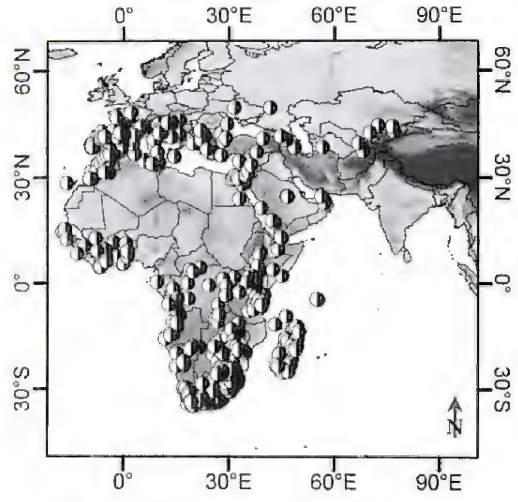

FIGURE 152. Collecting localities of *Tachysphex fugax*.

GEOGRAPHIC DISTRIBUTION (Fig. 152).— Africa including Madagascar, southern Europe, Middle East and southern Caucasus, Kazakhstan, Turkmenistan, Uzbekistan, and Tajikistan. Kohl's (1883c) record from Switzerland (Peney near Geneva) has not been confirmed by subsequent authors.

RECORDS (localities not followed by the number of specimens or a bibliographic reference are all from Pulawski, 1971).— **ALGERIA**: Alger (Morice, 1911), Birmandreis near Alger, Biskra (1 ♂, CU), Hussein Dey (Morice, 1911), Maison Carrée (de Beaumont, 1950a). **ANGOLA**: Cachoeiras 20 mi SW Gabela (1 ♀, 1 ♂, BMNH), 8 mi NE Cacula (2 ♂, BMNH), Curoca River 7 mi NE Porto Alexandre (1 ♂, BMNH), Duque de Bragança Falls (10 ♂, BMNH), Giraul River 10 mi NE Namibe (1 ♂, BMNH), 12 mi SW Luimbale (2 ♀, BMNH), Porto Alexandre (9 ♀, 11 ♂, BMNH), Santa Clara (1 ♀, BMNH), 3 mi N Santa Comba (1 ♀, 1 ♂, BMNH), Tundavala 8–10 mi NW Sa do Bandeira (1 ♀, 4 ♂, BMNH). **AUSTRIA**: **Steiermark**: Sternau SW Gamlitz at 47°07′N 16°26′E (Gusenleitner, 1998). **AZERBAIJAN**: coast N Astara (1 ♀, CSE), Gäncä. **BOTSWANA**: Makarikari Pans at 20°08′S 25°32′E (1 ♀, BMNH), Serowe (3 ♀; 1 ♀, AMNH). **BULGARIA**: Nesabar (1 ♂), Sandansky (2 ♀), Sozopol (1 ♂). **BURKINA FASO**: Bobo Dioulasso (1 ♂, FSAG), Boromo (1 ♂, FSAG), Diébougou (1 ♂, FSAG), Kompienga 20 km S Pama (2 ♀; 5 ♀, 1 ♂, LEM). **BURUNDI**: Bujumbura (1 ♂, MRAC). **CENTRAL AFRICAN REPUBLIC**: Kembe (3 ♂). **COMORO ISLANDS**: **Grand Comore**: Itsandra (1 ♀, KMG). **CONGO**: Djoué 17 km W Brazzaville (2 ♂, AMM). **CROATIA**: Istria Peninsula: no specific locality (1 ♀, 1 ♂, CU), Krapina (Vogrin, 1955). **CYPRUS**: Erimi (1 ♀). **EGYPT** (de Beaumont, 1940, or as indicated): **Al Fayyum**: Karanis (1 ♂). **Al Jizah** (= Ghiza): Hawamdieh (Honoré, 1942), Saqqara (1 ♂). **Al Qahirah** (= Cairo): Abu Zabal, Cairo (3 ♀, 3 ♂), Ezbet Nahlé, Gebel Asfar, Helwan, Maadi (1 ♀). **As Suways** (= Suez): Fayed at 30°19′N 32°19′E (1 ♂ CSE). **Aswan**: Aswan (4 ♂). **Sina** (= Sinai): Dahab (Roche and Zalat), 1994), Nakhl (1 ♀, MSNT), Tor (Kohl, 1885), Wadi Sudr 50 air km SE Suez (1 ♂). **Location unknown**: Sharkia Abu Hamad (1 ♂, FSCA). **ETHIOPIA**: **Gamo Gofa**: 42 road km NNE Arba Minch (1 ♂), 49 road km SE Sodo (1 ♂; 1 ♂, AAU). **Harergé**: Harer (R. Turner, 1917a), 37 km SE Jijiga (1 ♀). **Shewa**: Ziway (1 ♀). **Sidamo**: 16 km N Moyale (1 ♂), 22 km N Moyale (1 ♀, 3 ♂; 1 ♂, AAU), 35 km N Moyale (1 ♂), 4 km E Yabelo (1 ♀, 3 ♂; 2 ♂, AAU). **FRANCE**: **Aude**: Leucate (1 ♀), Preixan (1 ♀). **Bouches-du-Rhône**: Marseille (1 ♀, NHMW, lectotype of *filicornis*), Miramas (Berland, 1925). **Corrèze**: Argentat (Berland, 1925). **Corse**: Ajaccio. **Dordogne**: Le Coux near Eyzies (Steiner, 1955). **Drôme**: Dieulefit (Bernard, 1933). **Gard**: Générac (Berland, 1925). **Gironde**: Cestas, Vendays-Montalivet (Simon Thomas, 1972). **Hérault**: Montpellier (Kohl, 1885). **Loire-Inférieure**: Le Pouliguen (Berland, 1925). **Pyrénées-Orientales**: Argelès (Morel, Nouvel, and Ribaut, 1956), Baillaurie (Nouvel and Ribaut, 1958), Banyuls-sur-Mer (Nouvel and Ribaut, 1958). **Seine-et-Oise**: Saclas (Berland, 1925). **Vandée**: St.-Jean-de-Monts (Berland, 1925). **Var**: Caillan (Berland, 1925), Estérel (Bernard, 1935). **Vaucluse**: Carpentras (6 ♀, 6 ♂), Orange (Berland, 1925). Also found in several other Départements according to Bitsch et al. (2001:map 97), north to Loire-Atlantique. **GABON**: Léconi (1 ♀, FSAG), Owendo (1 ♀, 2 ♂, FSAG). **GEORGIA**: Tbilisi. **GHANA**: Accra near beach (2 ♀, 15 ♂), Kumasi (1 ♀, 1 ♂, BMNH), Legon 12 km NNE Accra (1 ♀, 2 ♂), Techiman (1 ♂), Tema (1 ♂). **GREECE**: **Aegean Islands**: Naxos, Rhodes: Empona (1 ♂). **Ionian Islands**: Corfou: no specific locality

(1 ♀, 2 ♂). **Macedonia**: Edessa (Schmidt and Westrich, 1983). **Sterea Ellás** (= Central Greece): Athens (1 ♂). **GUINEA**: Dabola (1 ♀, MNHN). **ISRAEL**: 135 km N Elat Iddan (1 ♀, 2 ♂, CSE), En Aqev near Sede Boker at 30°50.01′N 34°48.64′E (1 ♀, 7 ♂, CSE), En Gedi (1 ♂), Hazeva Field School in Arava Valley (1 ♂, CSE), Iddan in Arava Valley (2 ♀, 6 ♂, CSE), Mezad Aqrabbim 45 km SE Beersheba (1 ♂, CSE), Nakhal Zin at En Aqrabbim (1 ♂, CSE), Shizaf Nature Reserve near Hazeva in Arava Valley (1 ♀, CES), Wadi En Aqrabbim 50 km SE Beersheba (1 ♀, CSE), Wadi N'Aqev 5 km SSE Sede Boqer (1 ♂, CSE), Wadi Qelet 5 km W Jericho (1 ♂, CSE). **ITALY**: **Apulia**: Rodi Garganico (Foggia Province). **Emilia-Romagna**: Badagnano 20 km SE Piacenza (1 ♀, 1 ♂), Bologna (de Beaumont, 1954a), Grizzana in Bologna Province (Grandi, 1928), Rimini in Forlì Province (de Beaumont, 1954a). **Friuli–Venezia Giulia**: Eraclea Mare (Negrisolo, 1995), Porto Caleri (Negrisolo, 1995), Trieste (Graeffe, 1911). **Lazio**: Ostia (de Beaumont, 1959), Palo near Rome (de Beaumont, 1954a), Pontecorvo, Sabaudia (Pagliano, 1980). **Piemonte**: Priocca (Pagliano, 1990). **Sardegna**: Aggius, Arzachena (1 ♀), Domusnovas (Pagliano, 1990), Maddalena archipelago (Luchetti, 1993), Ploaghe near Sassari (Grandi, 1957), San Giorgio Molafá (1 ♂). **Toscana**: Caprona near Castelmaggiore di Calci in Pisa Province (de Beaumont, 1954a), Castiglione della Pescaia (Gayubo and Borsato, 1994), Isola di Gorgona (Generani, Pagliano, Scaramozzino, and Strumia, 2003); Molina di Quosa in Pisa Province, Pisa, San Vincenzo in Livorno Province (de Beaumont, 1954a). **Veneto**: Lido di Venezia (Giordani Soika, 1939), Venezia: Punta Sabbioni (de Beaumont, 1954b). **IVORY COAST**: Bouaké (3 ♀, RMNH), Bouaké: Foro-foro (2 ♀, 4 ♂, UCD), 15 km NW Boundiali (2 ♂, MSNT), 20 km W Boundiali (2 ♂), Degbezère 15 km E Bouaflé (1 ♀, RMNH), Ferkessédougou (1 ♂), Grand Béreby (4 ♀, 3 ♂; 1 ♀, FSAG; 1 ♀, 2 ♂, MSNT), 30–35 km N Korhogo (5 ♀, 1 ♂, ZMAN), Lamto (1 ♀, MNHN), Niakaramandougou (1 ♂), 56 km N Niakaramandougou (1 ♀, 2 ♂), 30 km S Odienné (1 ♂; 1 ♂, MSNT), Oumé (1 ♀), San Pédro (2 ♀, 2 ♂), Toumodi (1 ♀), 40 km S Toumodi (5 ♂; 1 ♀, 7 ♂, MSNT). **KAZAKHSTAN** (Kazenas, 2002): **Almaty**: Almaty, 5 km SW village Kazakhstan. **Pavlodar**: Zhabagly. **Zhambyl**: 50–60 km NW Furmanovka. **KENYA**: **Coast Province**: Diani Beach near Mombasa (1 ♂; 2 ♀, MCZ), Karacha forest 16 mi N Kilifi (3 ♀, 6 ♂), Kitani Lodge in Tsavo West National Park (1 ♂, USNM), Malindi (1 ♀, MSNT; 1 ♂, ZMAN), 20 km S Mombasa (1 ♂, USNM), Taita Discovery Centre (1 ♀), Tiwi Beaches ca 17 km S Mombasa (1 ♀, 4 ♂; 3 ♂, NMK), Voi (1 ♂), Voi area (9 ♀, 30 ♂, OÖLM), Watamu (2 ♂). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♀), 5 mi SW South Horr on S side of Nyiru Range (1 ♂, LACM), 94 km E Thika (1 ♀, 1 ♂). **Nyanza Province**: Papenditi (1 ♀, 2 ♂). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♀, 3 ♂), 5 km S Kajiado (4 ♂; 2 ♂, NMK), Magadi road 25 air km SW Nairobi (7 ♂; 5 ♂, NMK), Magadi Road 46 km SW Nairobi (1 ♀, 1 ♂), Marich Pass Field Studies Centre (1 ♀, 6 ♂), Mpala Research Station 48 km NW Nanyuki at 0.30°N 36.91°E (1 ♀, 4 ♂, LACM), ca 53 air km SW Nairobi (2 ♂). **Western Province**: Kakamega Forest Reserve (2 ♂). **LESOTHO**: Mamathes (23 ♀, 25 ♂, AMG; 7 ♂, BMNH; 3 ♀, 1 ♂, TMP), Teyateyaneng (2 ♀, AMG). **MADAGASCAR**: no specific locality (1 ♀, 1 ♂; 4 ♀, BMNH; 5 ♀, 7 ♂, MHNG, one ♀ labeled *Tachysphex sikorae*, lectotype and paralectotypes of *micromegas*; 7 ♀, 5 ♂, NHMW, determined as *micromegas* by F.F. Kohl). **Antananarivo**: Antananarivo (1 ♀, 2 ♂, LB; 1 ♂, MHNB), Antananarivo-Tsimbazaza (1 ♂, KU), 25 km W Antananarivo (3 ♀, 1 ♂, BMNH), Antsirabe (Leclercq, 1960), Manjakandriana: Mandraka (2 ♀, LB), Manjakatompo at 19°21′S 47°19′E (1 ♀, 1 ♂; 1 ♀, MHNB; 3 ♀, MSNT). **Antsiranana**: Amdondrobe at 13°42′55″S 50°06′06″E (1 ♀), Montagne d'Ambre National Park at 12°30.5′S 49°10.5′E (5 ♀) and 12°31.1′S 49°10.4′E (4 ♀, 1 ♂), Montagne des Français at 12°18.8′S 49°38.5′E (2 ♂), Nosy Be (3 ♀, MHNG, labeled *Tachysphex sikorae*, paralectotypes of *micromegas*), Nosy Be: Ampangorinana (1 ♂, MHNB), Reserve Spéciale d'Ankarana 2.6 km E Andrafiabe (2 ♀), 1 km W Sakalava Beach (1 ♂). **Fianarantsoa**: Ambositra (1 ♀, LB), 84 km NE Ihosy (2 ♂), Isalo area at 22°38′S 45°21′E (1 ♀, 1 ♂; 1 ♀, MSNT), Isalo National Park at 22°34′S 45°22′E = Piscine Naturelle (3 ♀, MSNT) and 22°36′S 45°10′E (6 ♀, 7 ♂), Kianjavato 55 km SW Mananjary at 21°23′S 47°40′E (2 ♂), Manombo Special Reserve 20 km SSW Farafangana (1 ♀, 1 ♂), 6 km SE Namorona (1 ♂), Ranohira (5 ♂), 10 km E Ranohira (4 ♀, 13 ♂), 5 km SW Ranohira at 22°36′S 45°23′E (1 ♀), Ranomafana (3 ♀, 3 ♂), Ranomafana National Park at 21°15.05′S 47°24.43′E (1 ♀). **Mahajanga**: Amboromalandy (1 ♀, MHNB), Amborovy 8 km NE Mahajanga (1 ♂; 1 ♀, MHNB), Katsepy (1 ♂, NHMW), Mahajanga (1 ♀, BMNH), Parc National d'Ankarafantsika: Ampijoroa Station Forestière 40 km NW Andranofasika at 16°19′15″S 46°48′38″E (1 ♂; 1 ♂, LB). **Toamasina**: Ambatondrazaka (12 ♀, 29 ♂, MRAC), Ambodivoahangy (Leclercq, 1990), Ampasimanolotra (as Brickaville): Ambila-Lemaitso (3 ♀, 1 ♂, LB), near entrance to Andasibe National Park at 18°55.6′S

48°24.5′E (2 ♀), Anosibé (1 ♀, 1 ♂, MHNB), Ivoloina (3 ♀, 1 ♂, LB), Mahavelona (2 ♀, 43 ♂, MRAC), Maroantsetra (1 ♀, MRAC), Moramanga (1 ♂, MHNB), 2 km S Moramanga (1 ♀, KU), 25 km W Morarano-Chrome (76 ♀, 8 ♂, MRAC), Périnet, now Parc National Andasibe (1 ♀, 1 ♂; 2 ♀, 5 ♂, AMG; 1 ♀, 1 ♂, MHNB), Station Alectra (1 ♀, MRAC), Toamasina (1 ♂, MHNB; 14 ♀, 6 ♂, MRAC), 112 road km SW Toamasina (1 ♀). **Toliara**: 22 km E Ampanihy at 24°41′S 44°46′E (1 ♂), Behara (Leclercq, 1960), Bekily (1 ♀, 1 ♂, BMNH; 3 ♀, MNHN), Bereboka 60 km NE Morondava (3 ♀, 3 ♂, BMNH), Berenty (10 ♀, 9 ♂; 7 ♀, 7 ♂, BMNH), Ifaty 22 km N Toliara at 23°11′S 43°37′E (1 ♀), Manderano at 23°31′39″S 44°05′17″E (1 ♀, 1 ♂), Miavy (3 ♂, LB), Morondava (1 ♀, KU), 50 km NE Morondava (1 ♀, 1 ♂, MRAC), Sakaraha (1 ♂, LB), Sept Lakes at 23°31′15″S 44°09′35″E (2 ♂), Taolanaro (1 ♂; 2 ♀, MSNT), Toliara (10 ♀, LB), 10 km NE Toliara (5 ♀, 6 ♂; 3 ♂, MSNT), 12 km SE Toliara at 23°25′S 43°45′E (11 ♂; 2 ♀, MSNT), 20 km W Tsiombe (5 ♂; 1 ♂, MSNT). **MALI**: 30 km N Bamako (1 ♀; 1 ♂, MS). **MALTA**: Chadwick Lakes (Schembri, 1991), Citadelle (Erlandsson, 1974), Fiddien (Schembri, 1991), St. Julians (Erlandsson, 1974). **MOROCCO** (de Beaumont, 1955, or as indicated): Agadir (Pulawski, 1971), Asni, Casablanca (3 ♂), Erfoud (1 ♀, AMNH), Fedhala, Ifrane (Nadig, 1933), Ijoukak, Kenitra (1 ♂), Marrakech, Mehdia near Kenitra (Pulawski, 1971), Meknès (2 ♀), Oued Adoudou, Tafraout (1 ♀), Tahar Souk (Pulawski, 1971), Tanger (1 ♂), Tinerhir, Tiznit (1 ♂). **MOZAMBIQUE**: Dondo (1 ♀, PPRI), Guengère in Pungoué Valley (1 ♀, MNHN). **NAMIBIA**: **Grootfontein District**: Gobiswater Farm 12 mi N Grootfontein (1 ♀, BMNH). **Karibib District**: Khan River 23 km N Karibib (2 ♀). **Outjo District**: 31 km SE Kamanjab (1 ♀). **Rehoboth District**: 23 km N Rehoboth (1 ♂, MS), 9 km S Rehoboth (1 ♂). **Rundu District**: Popa Falls (1 ♂, NMN), Rundu (1 ♀, 1 ♂, OHL), 100 km SW Rundu (1 ♀; 1 ♀, MS). **Swakopmund District**: Kuiseb River near Gobabeb (1 ♀, 1 ♂, PPRI). **Windhoek District**: Aris 25 km S Windhoek (2 ♂), 2 km S Aris (1 ♂), Bismarck River 30 km E Windhoek (1 ♂), Finkenstein Farm 17 km E Windhoek (1 ♀, OHL), Windhoek (1 ♀, BMNH), 37 km N Windhoek (1 ♂). **OMAN**: Ain Hamran (1 ♀, KMG), Behla (1 ♀, KMG), Rostaq (1 ♀, 1 ♂, KMG). **PORTUGAL**: (Diniz, 1964, or as indicated): Arieiro near Lisboa (1 ♀), Calhariz de Benfica (Pulawski, 1971), Coimbra, Évora, Lagoa de Albufeira, Lisboa, Moimenta da Beira, Montijo, Paço de Rei (Diniz, 1959), Pegões, Seixal including Porto do Rei (4 ♂), Tabuaço, Trafaria, Vale de Gaio (Diniz, 1959), Xabregas (Pulawski, 1971). **ROMANIA**: Caraorman in Danube delta (Scobiola-Palade, 1985). **RUSSIA**: **Rostov Oblast'**: Vëshenskaya village area at 49°37′N 41°45′E (Shkuratov, 2000). **SAUDI ARABIA**: Ad Diriyah (1 ♂, KMG), El Riyadh (1 ♀), Fayfa (1 ♀, KMG), S Jeddah (1 ♂, OHL), Wadi Maraba (1 ♂, KMG). **SENEGAL**: Dakar (4 ♀, 4 ♂, FB), Ndangane 45 air km SE Mbour (1 ♂), 3 km W Samba Dia = 70 air km W Kaolack (1 ♂, MSNT), Tioungoune (1 ♀, FSAG), Ziguinchor (1 ♂, FSAG). **SERBIA**: Niš (1 ♀). **SEYCHELLES**: Aldabra (1 ♀, 1 ♂, BMNH), Mahé (2 ♀, 3 ♂, BMNH), Silhouette (1 ♂, BMNH), no specific locality (3 ♀, BMNH). **SIERRA LEONE**: Freetown (2 ♀, 1 ♂, AEI). **SOMALIA**: Afgoi (1 ♂, RMNH), Far Seray (1 ♀, BMNH), Hargeisa (1 ♀, BMNH). **SOUTH AFRICA**: **Eastern Cape Province**: 17 mi S Adelaide (1 ♀, AMG), Alexandria (1 ♂, AMG), 10 km SE Alexandria (27 ♀, 29 ♂, OÖLM), Alexandria Forest (1 ♀, 2 ♂, AMG), Algoa Bay (19 ♀, 8 ♂, TMP), Aliwal North (1 ♂, PPRI), Bathurst (3 ♀, 5 ♂, AMG), 28 air km N Bedford at 32°33′S 26°00′E (1 ♂), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (1 ♀, AMG), Boesmans River near Grahamstown (1 ♀, SAM), Colchester at 33°42′S 25°50′E (1 ♂), East London (1 ♂, ZMAN), Elandsheuwels Farm 40 km W Steytlerville (1 ♂, USU), Fort Beaufort (1 ♀, 1 ♂, AMG), Gonubie at 32°56′S 28°02′E (1 ♀, 1 ♂, SAM), Grahamstown (7 ♀, 1 ♂, AEI; 5 ♀, 1 ♂, AMG; 1 ♀, PPRI; 3 ♀, 1 ♂, PMA), Grahamstown: Highlands (2 ♂, AMG), 18 km WNW Grahamstown: Hilton Farm (1 ♀, 1 ♂; 96 ♀, 40 ♂, AMG), Howison's Poort 6 km WSW Grahamstown (4 ♀, 1 ♂, AMG), Jeffrey's Bay (2 ♀, 1♂, ZMAN), Katberg (1 ♂, BMNH), Kenton-on Sea (1 ♀, AMG), Middelburg Division (3 ♂, SAM), Morgan Bay (2 ♀, AMG), Natures Valley (1 ♀, PPRI), Pearston (1 ♀, PPRI), Port Alfred: Salt Vlei (2 ♀, AMG), Port Elizabeth (1 ♂, USNM), Port Elizabeth: Walmer (1 ♂, AMG; 1 ♀, SAM), Queenstown (1 ♀, AMG; 1 ♂, BMNH), 6 km N Steytlerville (14 ♀, 11 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (7 ♀, 5 ♂, USU), Strowan Farm 5 air km W Grahamstown (1 ♀, 1 ♂, KU), Swartwaterspoort at ca 33°12′S 26°00′E (1 ♀, 1 ♂, AMG), Table Farm 10 km NW Grahamstown (2 ♀, 7 ♂, AMG), Tsitsikama Mts. (1 ♀, BALDOCK), Uitenhage (1 ♀, TMP), Van Stadens River mouth (1 ♂, SAM), Waaipoort Pass 19 km ENE Steytlerville at 33°14.8′S 24°19.8′E (1 ♂, USU), Whittlesea (2 ♂, AMG), Willowmore (1 ♀, AMG; 8 ♀, 7 ♂, TMP), 9 km E Willowmore (2 ♀, 2 ♂), 43 km NE Willowmore: Plessierivier (1 ♀, 5 ♂; 5 ♀, 1 ♂, USU), 37 km NW Willowmore in Grootrivierberg Range (3 ♀, 11 ♂, USU), 6 km S Willowmore at 33°20′S 23°27′E (2 ♀, 3 ♂), 11 km SW Willowmore at 33°22.3′S 23°24.7′E (1 ♂,

USU), 12 km W Willowmore at 33°16′S 23°22′E (1 ♂). **Free State**: Adullam Farm near Clarens at 28°32′S 28°28′E (2 ♂, PPRI), Bloemfontein (2 ♀, ZMAN), Bothaville (1 ♀, TMP), Caledon River between Bethulia and Aliwal North (1 ♂, SAM), Clocolan (1 ♂, AMG), Fouriesburg (1 ♀, OÖLM), Harrismith (2 ♀, 1 ♂, BMNH), Hendrik Verwoerd Dam (1 ♀, PPRI), Kroonstad (3 ♂, AMG), Marquard (1 ♂, AMG), Sandveld Nature Reserve ca 5 air km E Bloemhof at 27°40′S 25°41′E (1 ♀, 1 ♂), Tussen Die Riviere Game Reserve (2 ♀, 1 ♂, PPRI), Villers (1 ♀, OÖLM). **Gauteng**: Alberton (1 ♀, AMG), Benoni (1 ♂; 2 ♂, AMG), Discovery (1 ♀), Florida (1 ♂, AMG), Florida Lake (1 ♂), Johannesburg (1 ♀, AMG; 1 ♀, 1 ♂, CU), Pretoria (1 ♂; 1 ♀, 1 ♂, TMP), Pretoria Botanical Garden (3 ♂), Schoemansville (1 ♂, AMG). **Kwazulu-Natal**: Durban (1 ♀, SAM), 20 km S Emanguzi (3 ♂, OÖLM), Escombe (1 ♀, AMG), Eshowe in Zululand (3 ♀, 2 ♂, BMNH), near Hlatikulu in Drakensberg Mts. (1 ♂, ZMAN), Ingogo N Newcastle (1 ♀, 2 ♂, OÖLM), Lake Santa Lucia (1 ♀, 1 ♂, ZMAN), Lake Santa Lucia at Charters Creek (1 ♀, ZMAN), Mbazwana (1 ♂, OÖLM), Mkuzi in Zululand (1 ♂, PPRI), Ndumu Game Reserve (3 ♀, ZMAN), Pietermaritzburg (1 ♀, PMA), Rosebank (1 ♀, PPRI), Umfolozi in Zululand (1 ♀, AMG), Umtentweni (1 ♀, USNM), Underberg (1 ♀, 1 ♂, PPRI), Van Reenen (2 ♀, BMNH), 20 km W Vryheid (1 ♂, OÖLM). **Mpumalanga**: Crocodile Bridge in Kruger National Park (3 ♂, PPRI), Komatipoort (2 ♀, 3 ♂, PPRI), Loskop Dam Nature Reserve (1 ♀, 2 ♂, PPRI), Middelburg (1 ♀, AMG), Onder Sabie in Kruger National Park (2 ♂, PPRI), Pretoriuskop in Kruger National Park (3 ♂, USNM), Satara (1 ♂, PMA) and Skukuza in Kruger National Park (1 ♀, 3 ♂, PPRI; 1 ♀, PMA), Struben (1 ♀, AMG), Waterval-Boven (1 ♀, PPRI), Waterval-Onder (1 ♀; 1 ♀, AMG). **Northern Cape Province**: Buffels River SW Springbok (1 ♂, OÖLM), W Calvinia (2 ♂, OÖLM), Dassiefontein Farm near Kamieskroon (1 ♀, PPRI), Garies (2 ♀, 1 ♂, AEI), Goegap Nature Reserve 10 mi E Springbok (4 ♀, 3 ♂, AMG), Groen River 40 km SW Garies (2 ♀, 3 ♂, OÖLM), 25 km E Hondeklipbaai (1 ♀, 20 ♂, OÖLM), Kamieskroon to Sors Sors (1 ♀, AMG), 10 km E Kamieskroon (1 ♀, PMA), 42 km S Kamieskroon (1 ♀, AMG), SW Loeriesfontein (1 ♀, 1 ♂, OÖLM), Nababeep near Springbok (1 ♀, 1 ♂, AMG), Nieuwoudtville: Skuinshoogte Pass at 31°16′S 19°08′E (6 ♀, AMG), 5 km N Nieuwoudtville (1 ♀, AMG), VanWyksfontein 8 km W Norvalspont (1 ♀, AMG), Witsand Farm near Roaring Sands at 28°32′S 22°30′E (4 ♀, PMA). **Northern Province**: Altyddroog Farm 13 km W Beitbridge at 22°11′S 29°53′E (1 ♂, PPRI), Ben Alberts Nature Reserve at 24°37′S 27°23′E (1 ♀, 2 ♂, PPRI), Buffelspoort Dam (5 ♂, AMG), D'Nyala Nature Reserve (5 ♀, PPRI), Duiwelskloof at 23°42′S 30°06′E (1 ♀, PPRI), Ellisras (3 ♂, AMG), Entabeni Forest Reserve at 23°00′S 30°16′E (1 ♀, PPRI), Guernsey Farm 15 km E (1 ♀, 1 ♂, PMA) and 15 km NW Klaserie (1 ♂, PMA), Langjan Nature Reserve (1 ♀, PPRI), Merenski Dam (1 ♀, 3 ♂, USNM), Mogol Nature Reserve (6 ♀, 8 ♂, PPRI), 10 km SW Naboomspruit (3 ♀, 1 ♂, FSCA), 30 km E Nylstroom (2 ♂, PMA), Nylsvley Nature Reserve (1 ♀, PPRI), Pafuri in Kruger National Park (3 ♂, PPRI), Pietersburg (1 ♂, PPRI), 45 km N Pretoria (1 ♀, 1 ♂, MS), River Lodge near Strydom Tunnel at 24°22′S 30°41′E (1 ♀, PPRI), 5 mi N Warmbad (12 ♂, USNM). **North-West Province**: Breedtsnek Pass (2 ♂, AMG), Rustenburg (1 ♂, PPRI; 1 ♂, USNM), Swartruggens (1 ♀, AMG), Whittlesea (2 ♂, AMG). **Western Cape Province**: Ashton (2 ♀, 12 ♂, OÖLM), Barrydale (4 ♂, OÖLM), Biedouw Valley at 32°08′S 19°14′E (1 ♀, 6 ♂, PPRI), Botterkloof Pass 54 and 56 km NE Clanwilliam at 31°50′22″S 19°16′01″E (1 ♂, CSE) and 31°48′46″S 19°15′14″E (1 ♀, CSE), 25 km S Bredasdorp (4 ♂, ÖOLM), Cape Peninsula: Hout Bay (1 ♀, ZMLU, determined as *Tachysphex filicornis* by de Beaumont), Cape Town: Constantia at 23°02.6′S 18°25.8′E (1 ♂, USU), Cape Town: Kirstenbosch Botanical Garden at 33°59′S 18°26′E (2 ♀, 3 ♂), Cape Town including Milnerton (1 ♂; 4 ♂, BMNH; 27 ♀, 23 ♂, USNM), Cape Town: Table Mountain at 33°57′S 18°24′E (1 ♂), Ceres (1 ♀, BMNH), 8 mi N Citrusdal (2 ♀, SAM), 20 km N Citrusdal (1 ♂, OÖLM), 40 km E Clanwilliam: Sevilla (5 ♀, 2 ♂, USU), 56 km NE Clanwilliam, 5 km S Clanwilliam at 32°11.4′S 18°52.5′E (2 ♂), 31 km S Clanwilliam at 32°23.1′S 18°56.8′E (4 ♂), 11 km W Clanwilliam (1 ♀, AMG), 11 km W Clanwilliam: Ysterfontein Farm (2 ♀, USU), Clanwilliam-Citrusdal (2 ♂, AMG), Clanwilliam-Klawer (1 ♀, SAM), Dasklippas in Cederberg Mts. NE Porterville (1 ♂, OHL), Doringbos (4 ♀, 6 ♂, OÖLM), Greyton (2 ♀, 10 ♂, OÖLM), Hexriver Pass (1 ♀, BMNH), Karoo National Park at 32°20′S 22°30′E (3 ♀, 1 ♂, PPRI), Kleinmond: coast (3 ♂, OÖLM), Knersvlakte: railroad station at 31°34′47″S 18°30′13″E (2 ♂, OHL), Knysna (1 ♀, PPRI; 1 ♀, SCHL), Kommetjie (2 ♂, AMNH), Lambert's Bay (1 ♂, OÖLM), 5 km S Lambert's Bay (1 ♀, 22 ♂, OÖLM), 40 km S Lambert's Bay (3 ♂, OÖLM), Langberg (1 ♀, 11 ♂, OÖLM), 50 km W Loeriesfontein (1 ♂, OÖLM), Matjiesfontein (1 ♂), 7–10 mi SW Matjiesfontein (1 ♀, SAM), Montagu (1 ♂, BMNH), Mossel Bay (2 ♀, 8 ♂, BMNH; 5 ♀, 3 ♂, CU; 1 ♂, SAM), Nuwerus (1 ♂, OÖLM), Pakhuis Pass

13.5 km ENE Clanwilliam at 32°08′18″S 19°01′14″E (1 ♂, CSE), Pearly Beach (4 ♀, 1 ♂, SAM), Plettenberg Bay (1 ♂; 2 ♂, AMG; 1 ♂, USNM), Ratelfontein to Oloff Berghfontein at 32°02–15′S 18°35–31′E (1 ♀, AMG), Struisbaai (1 ♂, USU), Swartberg Pass (1 ♀, AMG), Swartrivier 7 km NW Prince Albert (1 ♀), 12 km S Vanrhynsdorp at 31°42.5′S 18°41.2′E (1 ♀), Wellington: Rooshoek (5 ♀, 4 ♂), Worcester (1 ♀, BMNH), 24 km W Worcester (2 ♂, USU). **SPAIN**: **Albacete** (Tormos, Asís, and Gayubo, 1994): Donal, Valdeganga. **Alicante** (Gayubo and Mingo, 1988; Torregrosa, Gayubo, Tormos, and Asís, 1993): Alicante, La Barranca, Muchamiel, Novelda, Orihuela, San Vicente del Raspeig, Sax. **Almería**: Alpujarras (1 ♂), Laujar (Suárez, 1959), Paterna (Suárez, 1959). **Baleares**: Mayorca: Col d'en Rebassa (Compte Sart, 1959), Porto Pi (Saunders, 1904). **Burgos** (Gayubo and Sanza, 1986): Fuentelcésped, Fuentespina. **Cáceres**: Mesillas (Gayubo et al., 1990a). **Canary Islands**: Tenerife: San Andrés (de Beaumont, 1968; Simon Thomas, 1969). **Gerona**: Palamós (Königsmann, 1971). **Granada**: Granada. **Guipúzcoa**: Irún (Gayubo and Mingo, 1988). **Huesca**: Barbastro (Gayubo and Mingo, 1988). **Jaen**: Las Correderas. **León**: Villablino (Gayubo and Mingo, 1988). **Madrid** (Gayubo and Mingo, 1988, or as indicated): Alcalá de Henares, Arganda, El Escorial, El Pardo, Madrid (1 ♀), Móstoles, Parla, Ribas de Jarama, San Fernando de Henares, Vaciamadrid, Villaverde, Villaviciosa de Odon. **Málaga**: Málaga, Marbella (de Beaumont, 1962), San Pedro de Alcantara, Velez. **Navarra**: Tudela. **Salamanca** (Gayubo, 1984a): Aldearrubia, Valverdón. **Segovia**: Coca (1 ♀, 1 ♂, SCHL), Lastras de Cuéllar (Gayubo and Heras, 1986). **Soria** (Gayubo, García, Torres, and González, 1999): Alcubilla del Marqués, Bayubas de Abajo, Garray, Lubia, Quintana Redonda, Rejas de San Esteban, Riba de Escalot, San Esteban de Gormaz, Soria (2 ♂, SCHL), Villaverde del Monte. **Teruel**: Oliete (Dusmet, 1915). **Toledo**: Alberche (Gayubo and Mingo, 1988), Escalona (Gayubo et al., 1990), Seseña (Gayubo and Mingo, 1988), Toledo. **Valencia**: Picasent (Giner Marí, 1935), Valencia (Gayubo and Mingo, 1988). **Valladolid**: Alcazarén (Gayubo and Heras, 1986), San Miguel del Arroyo (Gayubo, 1985a), Viana de Cega (Gonzáles, Gayubo, and Torres, 1998). **Vizcaya**: Bilbao (Gayubo and Mingo, 1988). **Zamora**: Fermoselle (Gayubo, 1985b), Peleas de Arriba (Gayubo, 1986a), Toro (Gayubo, 1986). **Zaragoza** (Gayubo and Mingo, 1988): Calatayud, Tiermas. Also: **Cataluña** (Antiga and Bofill): Pedralbes, Vallvidrera. **SYRIA**: Barzé near Damascus. **TAJIKISTAN**: Kabadian. **TANZANIA**: **Coast Region**: Pugu Forest near Kisarawe (1 ♂). **Dar es Salaam Region**: Bahari Beach 20 km N Dar es Salaam (1 ♀, 1 ♂), Dar es Salaam University Experimental Forest (3 ♂, PMA), University of Dar as Salaam campus (2 ♀, 3 ♂). **Iringa Region**: Iringa (1 ♀, 1 ♂), 18 km W Iringa (1 ♂). **Kilimanjaro Region**: 24 km NNE Same (2 ♂). **Morogoro Region**: 43 km E Morogoro (1 ♀), 128 road km NW Morogoro (7 ♀, 10 ♂), 48 km W Morogoro (7 ♀, 12 ♂; 2 ♀, 4 ♂, UDS), 62 road km SW Morogoro (6 ♀, 9 ♂), Ruaha River bank 7 km S Mikumi (7 ♀, 9 ♂). **Mwanza Region**: Mwanza (1 ♀, ZMAN). **Tanga Region**: East Usambara Mountains (Rodgers and Homewood, 1982), 33 km SW Korogwe (3 ♂), 10 km WNW Mabokweni (1 ♀). **Zanzibar Region**: Pemba Island (1 ♀, AMM); Unguja (= Zanzibar Island): airport (1 ♀, 2 ♂, MSNT), Kizimbani (1 ♂, MRN), Masingini (2 ♀, 3 ♂, MSNT). **TOGO**: Amaoudé 17 km N Sokodé (7 ♂), Atakpamé (1 ♂), Kaodé (1 ♂, ZMAN), Sokodé (1 ♀, FSAG), 12 km S Sokodé (1 ♂), 5 km W Sokodé (6 ♂; 3 ♀, FSAG). **TUNISIA**: Kasserine at 35°14′N 8°59′E (1 ♂; 1 ♀, CSE), Kebili (1 ♀, CSE), Lac Ichkeul 25 km S Bizerte (1 ♂, CSE), Nefta at 33°55′N 7°53′E (2 ♂; 2 ♂, CSE; 1 ♂, MS), Shkira 50 km N Gabès (1 ♀, CSE), Tozeur (3 ♂). **TURKEY**: **Bursa**: 10 km S Karacabey. **Istanbul**: Anadolu Kavagi 25 km N Üsküdar (Hensen and van Ooijen, 1987). **Trabzon**: Kadirga Yalasi (Gayubo, Özbek, and Yildirim, 2003). **Urfa**: Halfeti (Hensen and van Ooijen, 1987). **TURKMENISTAN**: Kara Kala. **UGANDA**: Ankole Kichwamba (2 ♀, USNM), 23 mi W Masindi (1 ♂). **UKRAINE**: Kanev Nature Reserve (Gorobchishin, 1995, 1996). **UNITED ARAB EMIRATES**: Hatta (1 ♂, KMG). **UZBEKISTAN**: Samarkand (1 ♂, ZMMU, holotype of *fugax*). **YEMEN**: Aden (Bingham, 1898), Al Lahim (7 ♂, ZMAN), Lahj (4 ♀, 4 ♂, RMNH), Rougrapat in Wadi el Gaber (1 ♀; 1 ♀, MHNCF). **ZAIRE**: Bwamanda (2 ♀, FSAG), Epulu (1 ♀, 1 ♂, CU), Kabalo (1 ♀, BMNH), Matadi (1 ♀), Musango (2 ♂, CAS, FB). **Equateur**: Bokata (1 ♀, FSAG), Eala (1 ♀, FSAG), Gemena (2 ♀, FSAG). **Federal District**: Kinshasa (1 ♀, MRAC). **Haut-Zaïre**: Kisangani (1 ♂, AMNH). **Kivu**: Ruindi Camp in Virunga National Park (1 ♂, CU), Uvira (1 ♀, MRAC). **Shaba**: Biano (2 ♂, BMNH), Kuwezi (1 ♂, FSAG) and Lusinga (1 ♂, FSAG) in Parc National de l'Upemba, Likasi (1 ♀, LACM, as Jadotville). **Zaïre Central**: Boma at 6°00′S 13°00′E (2 ♀, AMNH), Mbanza Ngungu at 5°30′S 15°00′E (4 ♂; 1 ♀, AMNH), Zambi at 6°00′S 12°50′E (1 ♀, AMNH). **ZAMBIA**: **Eastern Province**: 20 km SE Chipata (1 ♀, USU), Luwumbu Valley in Upper Luangwa (1 ♀, BMNH), 31 km E Petauke (1 ♂), 32 km E Petauke (2 ♂), 42 km WSW Petauke (1 ♀, 8 ♂), ca 210 road km WSW Petauke (1 ♂). **Lusaka Province**: Chilanga

15 km S Lusaka (1 ♀), 21 km E Lusaka (1 ♀, MSNT), ca 20 km E Lusaka International Airport (1 ♀, 4 ♂). **Northern Province**: 65 road km NE Serenje (2 ♀, 3 ♂; 2 ♀, NHMZ). **Southern Province**: 5 km E Choma (2 ♂), 22 km E Kalomo (2 ♂), 7 km SW Kalomo (17 ♀, 3 ♂; 4 ♀, 2 ♂, MSNT), 9 km SW Kalomo (21 ♀, 8 ♂), 12 km SW Kalomo (8 ♀, 8 ♂, MSNT), 18 km NE Pemba (1 ♀, MSNT). **ZIMBABWE**: Bulawayo (2 ♀, 2 ♂, AMG; 1 ♂, AMNH; 1 ♀, ANSP; 2 ♀, 3 ♂, TMP; 1 ♂, ZMLU, determined as *Tachysphex filicornis* by de Beaumont), Bulawayo: Hillside (1 ♀, 2 ♂, TMP), Charara 20 km ESE Kariba (1 ♀, 8 ♂), Chishawasha near Harare (1 ♀, 1 ♂, BMNH), Harare (1 ♀, AMG), near Harare [probably Chishawasha] (2 ♀, RMNH), Hope Fountain (1 ♂, TMP), Iwaba near Kwekwe (1 ♂, BMNH), Joblings Farm (1 ♂, ZMAN), Kami Ruins (1 ♀, 1 ♂), Lion and Cheetah Park 24 km W Harare (1 ♀, 2 ♂), Mavuradonha Wilderness area 15 km E Muzarabani (4 ♂, OÖLM), Mbizi Game Park (= Rocky Farm) 20 km SE Harare (3 ♂), 11 km NE Nyamandhlovu (1 ♂), 7 km WSW Nyamandhlovu at Kami River (1 ♂), Nyika 80 km E Masvingo (1 ♂, OÖLM), Redbank at Kami River (3 ♀, 3 ♂), Sawmills (1 ♂, PPRI; 1 ♂, ZMAN), Sawmills at Umguza River (2 ♂), St. Benedict 80 km NE Macheke (2 ♀, 3 ♂), Umtali (1 ♀, ZMAN), Victoria Falls National Park (1 ♂, USNM).

Tachysphex fulgidus Arnold

Figures 153, 154.

Tachysphex fulgidus Arnold, 1924:67, ♀, ♂. Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (TMP), **here designated**, examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex fulgidus* has the labrum convex and protruding beyond the clypeal free margin. It has an unique galea which is practically unsculptured proximally, and minutely, densely punctate in the distal third and whose crease is transverse and curving up dorsally (Fig. 153c). Also unique is the propodeum: the dorsum is dull, longitudinally ridged, whereas the side is punctate (except anteriorly), with practically unsculptured interspaces. Subsidiary recognition features are: erect body setae sinuous, including those on the postocellar area and the basal declivity of tergum I (as in *hadronyx*); mesothoracic punctures well defined; fore- and midfemoral venters, in both sexes, with a few, sparse punctures and alutaceous interspaces.

Description.— Labrum convex, markedly protruding beyond clypeal free margin. Galea as long as scape, practically unsculptured proximally, but distal third sharply delimited, with minute, nearly contiguous punctures; crease transverse, curving up dorsally (Fig. 153c). Mesothoracic punctures well defined (interspaces shiny); averaging several diameters apart on scutal disk; about 1–2 diameters apart near center of mesopleuron, less than one diameter apart on episcrobal area; 2–3 diameters apart on mesothoracic venter. Episternal sulcus complete. Propodeal dorsum dull, longitudinally ridged; side punctate (except ridged next to metapleural sulcus), interspaces shiny. Hindcoxal dorsum with inner margin carinate basally. Fore- and midfemoral venters with a few, minute punctures (interspaces alutaceous).

Setae (numbers in parentheses indicate setal length expressed as a fraction of basal mandibular width): sinuous, suberect to erect, on frons, postocellar area (0.5), lower gena (0.5), mesothorax (0.5 on scutum anteriorly), propodeal dorsum (0.6), and basal declivity of tergum I (up to 0.5).

Head and thorax black, mandible yellowish red except apically. Frontal setae silvery in female, golden in male. Wing membrane hyaline; forewing costal vein light brown, subcostal vein brown. Femora black except apically, tibiae and tarsi red. Gastral segments I–III red, remainder black. Terga not fasciate apically.

♀.— Clypeus (Fig. 153a): bevel longer than basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip arcuate, shallowly sinuous laterally. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 2.1 × apical width. Midtrochanteral venter: punctures many diameters apart. Foretibial outer surface impunctate, glabrous, with one spine.

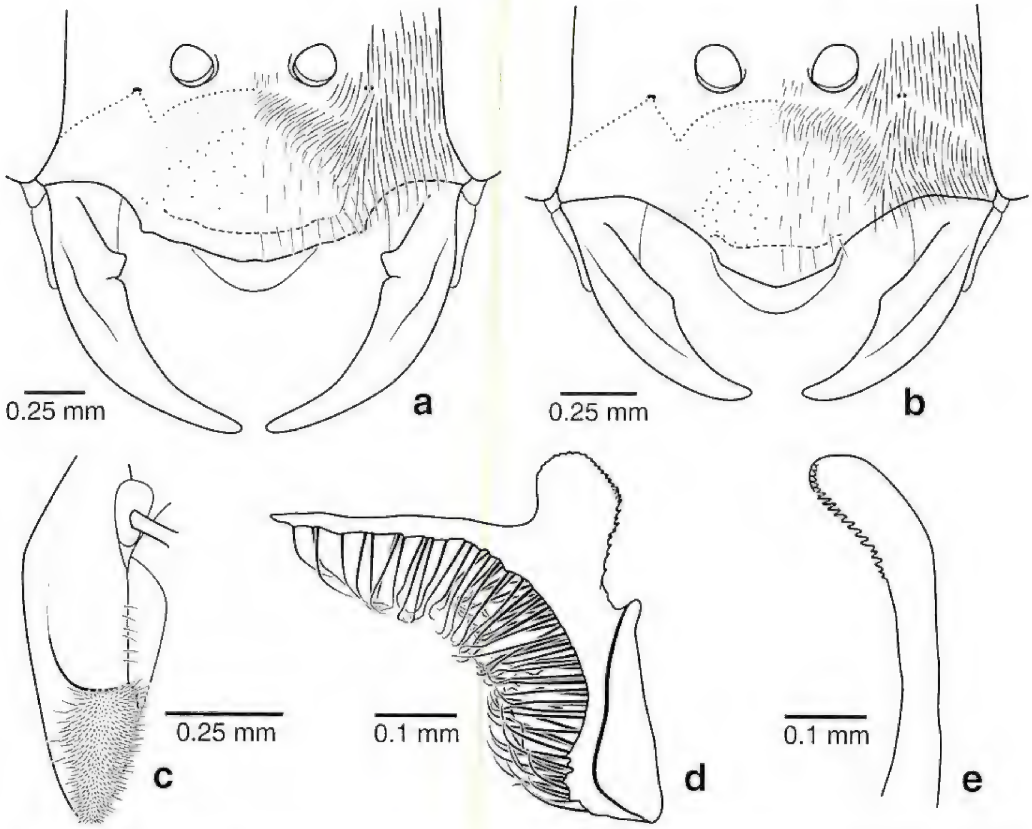

FIGURE 153. *Tachysphex fulgidus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – female galea; d – volsella; e – penis valve.

Forebasitarsus with eight or nine rake spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate with a few, sparse punctures, interspaces alutaceous. Length 9.4 mm.

♂.— Mandibular inner margin with low, obtuse tooth, without cleft. Clypeus (Fig. 153b): bevel longer than basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin obtusely pointed, with well-defined corner; distance between corners 0.6 × distance between corner and orbit. Width of postocellar area 1.3 × length. Dorsal length of flagellomere I 2.2 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with three rake spines on one leg and four on the other; outer apical spine of foretarsomere II longer than tarsomere III. Sternal punctures minute but well defined, apical depressions of sterna III–VI impunctate. Length 7.5 mm. Volsella and penis valve: Figs. 153d, e.

COLLECTING DATES.— The two known specimens were collected on 15 February 1903 (male) and 10 January 1912 (female).

GEOGRAPHIC DISTRIBUTION (Fig. 154).— Known only from Willowmore in Eastern Cape Province, South Africa.

RECORDS.— **SOUTH AFRICA: Eastern Cape Province**: Willowmore (1 ♀, 1 ♂, TMP, lectotype and paralectotype of *fulgidus*).

Tachysphex fulvitarsis (A. Costa)

Figures 154–156.

[N.B. There are more than 160 literature citations of *fulvitarsis* and its synonyms subsequent to the original descriptions, mainly locality records from southern and central Europe, but only the essential nomenclatural references are provided below. Previous revisionary works are by de Beaumont, 1936a:203 and Pulawski, 1971:90.]

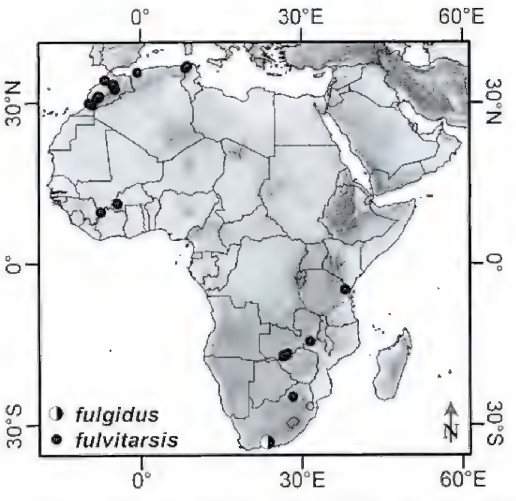

FIGURE 154. Collecting localities of *Tachysphex fulgidus* and *fulvitarsis* (African localities only).

Tachytes fulvitarsis A. Costa, 1867a:86, ♀. Holotype: ♀, Italy: Napoli area (NAPOLI), not examined.— As *Tachysphex fulvitarsis*: de Beaumont, 1936c:6 (study of type, new combination).

Tachytes fulvitarsis A. Costa, 1867b:30, ♀. Objective synonym of *Tachytes fulvitarsis* A. Costa, 1867a.

Tachytes acrobates Kohl, 1878:705, ♀. Lectotype: ♀, Austria: Tirol: Zams (NHMW), **here designated**, examined. Synonymized with *Tachysphex fulvitarsis* by de Beaumont, 1936a:203, 1936b: 617, and 1936c:6.— Kohl, 1880:180, 234 (description of ♂).— As *Tachysphex acrobates*: Kohl, 1883c:671 (new combination).

Tachytes strigosus Mocsáry, 1879:126, ♀. Syntypes: ♀, Hungary: Budapest (TMB), not examined. Synonymized with *Tachysphex acrobates* by Kohl, 1885:390.

Tachytes erythrogaster A. Costa, 1882a:197, sex not indicated (as *erythrogastra*, incorrect original termination). Holotype or syntypes: Italy: Sardegna: Cagliari (NAPOLI), not examined. Synonymized with *Tachytes fulvitarsis* by A. Costa, 1884:246 and 1885:17.— As *Tachysphex erythrogaster*: de Beaumont, 1936c:7 (new combination).— As *Tachysphex fulvitarsis erythrogaster*: Pulawski, 1971:95 (new status, in revision of Palearctic *Tachysphex*).

Tachytes erythrogaster A. Costa, 1883b:334, sex not indicated (as *erythrogastra*, incorrect original termination). Objective synonym of *Tachytes erythrogaster* A. Costa, 1882a.

Tachytes dubius Radoszkowski, 1886:31, ♂. Syntypes: ♂, Russia: Orenburg; Turkmenistan: Askhabad; and Caucasus: no specific locality (KRAKÓW), not examined. Synonymized with *Tachysphex acrobates* by de Beaumont, 1936a:204, 1936b:617, and 1936c:6, who studied type material.

As *Tachysphex caucasicus* (Radoszkowski, 1886): Kohl, 1888a:143 (♂ only; ♀ = *Tachysphex stachi* de Beaumont).

Tachysphex bipunctatus F. Morawitz, 1891:207, ♀. Holotype: ♀, Kazakhstan: Ryn-Peski (ZIN), examined before 1971. Synonymized with *Tachysphex fulvitarsis* by Pulawski, 1971:90.

RECOGNITION.— *Tachysphex fulvitarsis* has a dull mesopleuron, with shallow punctures that vary from less than one diameter apart to compressed against each other, a ridged propodeal side, and setae of the propodeal dorsum oriented anterad. The female has a unique combination of an obtusely pointed clypeal lip (Fig. 155a) and a mesally emarginate labrum (Fig. 155c). An unusually well-defined setigerous groove on the labrum's posterior surface, adjacent to its free margin, is also distinctive (Fig. 155c). The male can be recognized by its clypeal lobe that is pointed mesally and not angulate laterally, the clypeal free margin forming a single curved line from the point tip to orbit (Fig. 155b). The inner mandibular margin is not dentate, a subsidiary recognition feature.

JUSTIFICATION OF NEW SYNONYMY.— Pulawski (1971) considered *Tachysphex erythrogaster* to be a Corsican and Sardinian subspecies of *fulvitarsis*, based on an all red gaster of most females. Schmidt *in* Bitsch et al. (2001:151) regards it as a simple color form that he calls *fulvitarsis* form *erythrogaster* (an infrasubspecific name, not available according to Article 15.2 of the Code). Costa

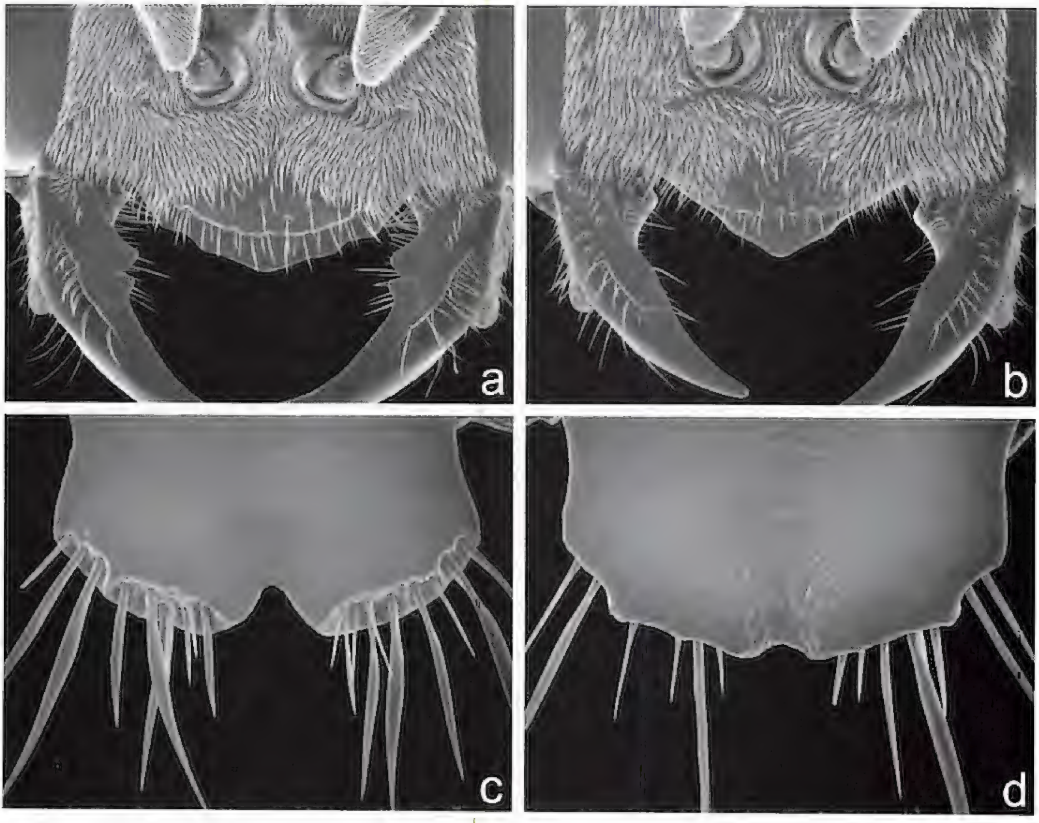

FIGURE 155. *Tachysphex fulvitarsis* (A. Costa): a – female clypeus and mandible (×20); b – male clypeus and mandible (×46); c – female labrum, posterior surface (×132); d – male labrum, anterior surface (×210).

(1884, 1885) already treated these two names as synonyms, and I agree with his opinion now.

DESCRIPTION.— Scutal punctures less than one diameter apart. Mesopleural punctures shallow, varying from less than one diameter apart to compressed against each other. Propodeal dorsum rugose; side ridged. Hindcoxal dorsum with inner margin carinate basally or not carinate.

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina (setal length about 0.2 × basal mandibular width); oriented obliquely anterad on propodeal dorsum (except oriented posterad on small, basomedian area).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal and subcostal veins brown. Legs and gaster varying from all red to all black (see Variation below). Terga I–III silvery fasciate apically.

♀.— Labrum: free margin narrowly emarginate mesally, posterior surface with unusually well-developed row of setigerous punctures adjacent to free margin (Fig. 155c). Clypeus (Fig. 155a): bevel as long as basomedian area or longer; lip free margin obtusely pointed, shallowly concave laterally. Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 2.1–3.0 × apical width. Dorsal foretibial surface with two spines; outer surface with one spine near midlength. Forebasitarsus with 7–9 rake spines. Apical depression of tergum V: see Variation below. Pygidial plate: punctures averaging 2–3 to many diameters apart, interspaces conspicuously microsculptured to largely unsculptured. Length 9.0–14.0 mm.

♂.— Mandible: trimmal carina without tooth or cleft (Fig. 155b). Labrum free margin slightly emarginate (Fig. 155d) to slightly projecting mesally. Clypeus (Fig. 155b): bevel about as long as basomedian area to markedly shorter; lip free margin pointed mesally (obtusely so in some specimens), not angulate laterally (clypeal free margin thus forming single curved line from midpoint to orbit). Width of postocellar area 1.4–1.6 × length. Dorsal length of flagellomere I 1.4–1.9 × apical width. Forefemoral notch microscopically setose, somewhat smaller than average for the genus. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length 6.0–13.0 mm. Volsella and penis valve: Fig. 156.

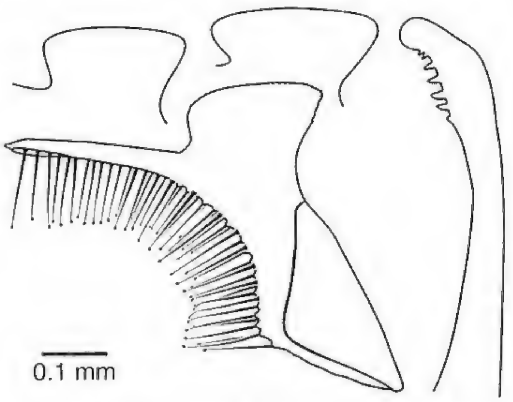

FIGURE 156. *Tachysphex fulvitarsis* (A. Costa): volsella with outlines showing individual variation and penis valve.

VARIATION.— Color of legs. In most populations, the femora and tibiae are black, and the tarsal apex is reddish or (Zambian specimens) the tarsi are all black. In the specimens from the Ivory Coast, red are: the fore- and midfemoral apex, hindfemur, tibiae, and tarsi.

Color of gaster. In most populations, the gaster is red basally (segments I and II or I–III) and black apically. The entire gaster is black in some specimens from Spain, Portugal, Transcaspia, and in all specimens from Israel, Tanzania, Zambia, and South Africa. The gaster is all red in many females from Corsica and Sardinia.

Apical female tarsomeres. Unusually stout in Palearctic specimens (see Pulawski, 1971:Fig. 21), but of the average shape for the for the genus in sub-Saharan individuals.

Apical depression of female tergum V. Finely punctate throughout in most populations, but impunctate in some Palearctic specimens.

NESTING BEHAVIOR.— Nesting habits of *Tachysphex fulvitarsis* were observed by Ferton, 1901a (Corsica) and 1912 (Algeria), Bernard, 1934 (France), Deleurance, 1946 (France), Olberg, 1959 (Germany), Bonelli, 1988 (Sardinia), and Kazenas and Nasyrova, 1991 (Kazakhstan). Their data are summarized below.

Adult individuals spend the nights in burrows that they dig in the ground (Olberg). The nest consists of an oblique gallery and a single cell and is permanently open during the provisioning period (Deleurance, Bonelli). Tettigoniid nymphs are used as prey: *Ctenodecticus bolivarii* Targioni Tozetti, *Platycleis intermedia* (Audinet-Serville), and *Platycleis tessellata* Charpentier; and Deleurance records "other undetermined locusts." Prey are flown to the nest, kept venter to venter (Bonelli). Kohl's (1885) record of *fulvitarsis* preying upon hemipteran nymphs was not confirmed by subsequent authors. From one (Ferton, 1901a) to several incompletely paralyzed prey are stored in a cell. The egg is glued by the cephalic end to the prey's forecoxa (Ferton, 1901a; Bonelli, 1988), perpendicularly to the victim's long axis; the incubation period is about 35–48 hours.

GEOGRAPHIC DISTRIBUTION (Fig. 154).— Europe (excluding British Isles) north to southern Sweden (Perkins, 1942; Tjeder, 1951), Africa, Middle East, Pakistan, Kazakhstan, and Transcaspia, Siberia east to Kyakhta in Chita Oblast' and to Semenovka in Amur Oblast' (Kazenas, 1980), north to Yakutsk.

RECORDS (only African and Pakistani localities).— **ALGERIA**: Oran (Pulawski, 1971). **BURKINA FASO**: Bobo-Dioulasso (1 ♂, FSAG). **IVORY COAST**: Bouaké: Foro-foro (1 ♂; 1 ♀, 1 ♂, UCD). **MOROCCO** (from de Beaumont, 1955, or as indicated): Arbalou 43 km SE Marrakech (1 ♀, ZMAN), Asni,

Azrou in Moyen Atlas (Pulawski, 1971), Douet-Aoua (Pulawski, 1971), Ifrane, Ijoukak, Kenitra: Mehdia, Mikdane in Gebel Ayachi (Pulawski, 1971), Tafraout, Tiznit: Oued Massa. **PAKISTAN**: **Sind**: Kirthar National Park 150 km NE Karachi, 25°10′–26°05′N 67°10′–67°55′E (1 ♀). **SOUTH AFRICA**: **Northern Province**: 5 mi W Warmbad (1 ♀, USNM). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe (1 ♀). **TUNISIA**: Ain Soltan 40 km W Jendouba (1 ♀, CSE), Tabarka (1 ♂, CSE). **ZAMBIA**: **Eastern Province:** 31 km E Petauke (1 ♂). **Southern Province**: 56 road km NE Choma (1 ♂), 25 km E Kalomo (1 ♀, MSNT), 7 km SW Kalomo (19 ♀, 20 ♂; 4 ♀, MSNT), 9 km SW Kalomo (4 ♀, 1 ♂).

Tachysphex gagates Arnold

Figures 157, 158.

Tachysphex gagates Arnold, 1940:119, ♀. Holotype: ♀, Zimbabwe: Kami (SAM), examined.— Bohart and Menke, 1976:274 (listed).

Recognition.— *Tachysphex gagates* is easily recognized by its shiny propodeum whose dorsum and side have inconspicuous microscopic punctures, with interspaces unsculptured or aciculate; at most the posterior face is punctate or ridged. Subsidiary recognition features include: genal and thoracic setae sinuous, gaster all red, and legs largely red. The dentate free margin of the female clypeal lip is also distinctive (Fig. 157a).

Description.— Frons dull, microsculptured, with minute, ill-defined punctures. Scutal punctures about two to many diameters apart on disk in female and many males, but about one diameter apart in some males from Kenya. Mesopleural punctures minute, ill defined, about one diameter apart near episternal sulcus, up to several diameters apart posteriorly. Punctures of mesothoracic venter varying from about one diameter apart to about 2–3 diameters apart. Propodeum shiny, unsculptured or aciculate except for sparse, microscopic punctures, but posterior face in some specimens with well-defined punctures or transverse ridges. Hindcoxal dorsum with inner margin carinate basally.

Setae erect, straight on postocellar area; sinuous on lower gena, occiput, and thorax (including propodeum); setal length (expressed as a fraction of basal mandibular width): 0.2–0.4 on postocellar area, about 0.6 on each side of oral fossa next to occipital carina as well as on scutum anteriorly, and up to 0.8 between propodeal side and posterior face. Mesopleural setae largely concealing integument in female but not in male. Setae of propodeal dorsum variously oriented, but most median setae inclined obliquely anterad.

Head and thorax black, scapal venter and mandible yellowish red (mandible black apically), also clypeal bevel in some males; pronotal lobe light brown posteriorly in male. Frontal setae silvery in female, golden in male. Wing membrane hyaline; forewing costal vein reddish, subcostal vein dark brown. Femora, tibiae, and tarsi red or basal half of forefemur and basodorsal area of midfemur black. Gaster red but tergum V largely black in females from Kenya. Terga I–IV silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 157a): bevel markedly convex, longer mesally than basomedian area; lip free margin arcuate, emarginate mesally, with a pair of admedian teeth and three pairs of lateral teeth (lateral teeth ill defined in some specimens). Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.0–2.1 × apical width. Dorsal foretibial surface with two or three spines; outer margin with one to three spines, punctures several to many diameters apart. Forebasitarsus with 10–12 rake spines. Tarsi shortened: length of fore- and midtarsomeres II about 1.8–2.0 and 2.1–2.2 × apical width, respectively; that of midtarsomere III 1.2 × apical width; that of fore-, mid-, and hindtarsomeres IV about 1.1–1.2, 0.8–0.9, and 0.9–1.0 × apical width, respectively; apicoventral margin of tarsomeres IV concave. Tarsomeres V elongate, markedly curved in lateral view, not angulate basoventrally, without spines on venter or lateral mar-

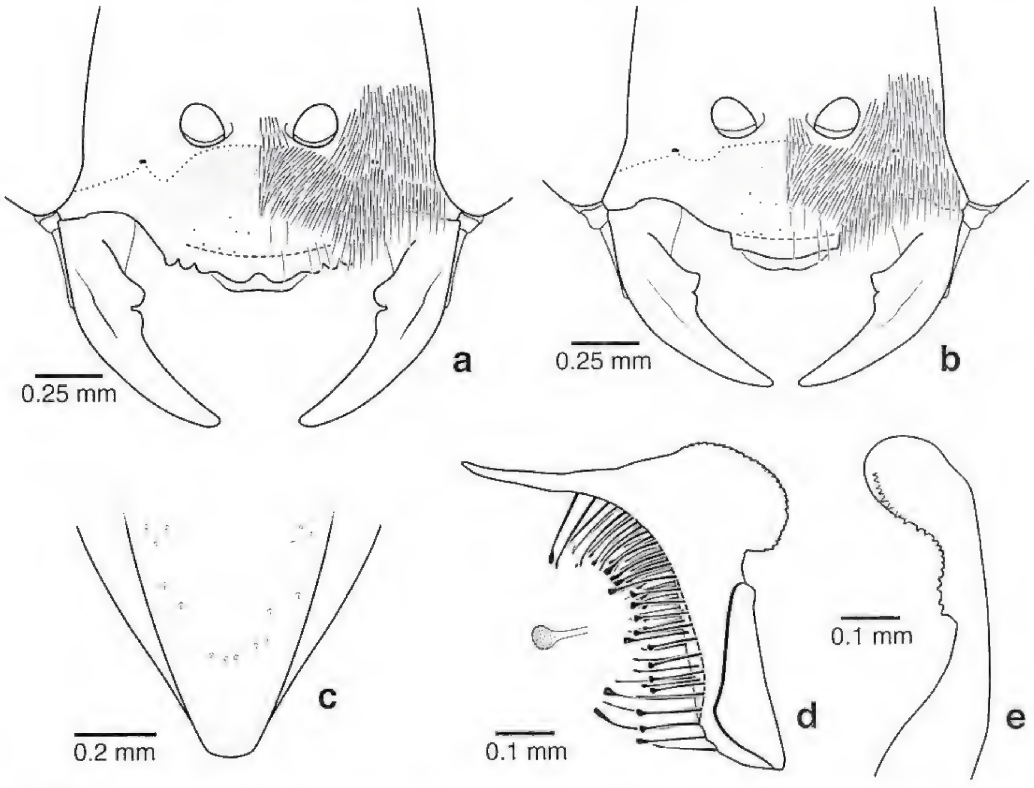

FIGURE 157. *Tachysphex gagates* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – pygidial plate of female; d – volsella; e – penis valve.

gins; apicoventral margin convex; claws elongate, equal in size. Apical depression of tergum V impunctate. Pygidial plate broader than average for the genus, rounded apically (Fig. 157c), with punctures that are several to many diameters apart; interspaces aciculate or unsculptured. Length 8.0–9.8 mm.

♂.— Mandible: trimmal carina with tooth; cleft varying: present in most specimens from Namibia and South Africa, but ill defined or absent in those from Kenya and Tanzania. Clypeus (Fig. 157b): bevel shorter to longer than basomedian area; lip free margin arcuate, with well-defined corners; distance between corners about 0.7 × distance between corner and orbit. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.5–2.1 × apical width. Forefemoral notch with microscopic setae, margined anteriorly. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II as long as tarsomere III or shorter. Punctures of tergum VII varying from less than one diameter apart to several diameters apart mesally. Sterna punctate and setose, except basal portions of sterna III–V asetose (asetose portions may be hidden); punctures becoming large on sterna IV–V; preapical setae suberect on sterna IV–VI. Length 5.6–9.1 mm. Volsella and penis valve: Figs. 157d, e.

HABITAT.— The Kenyan specimens collected at Olorgesailie and 120 km S Lodwar were all found on sand in a dry river bed under flowering trees, *Ziziphus mucronata* Willdenow (Rhamnaceae). They were landing on the ground, resting a short while, and then flying to a new place or coming back to the same place. Tanzanian specimens north of Korogwe were attracted to

the flowering small trees, *Boscia angustifolia* A. Rich. (Capparidaceae).

Geographic distribution (Fig. 158).— Kenya to Namibia and South Africa.

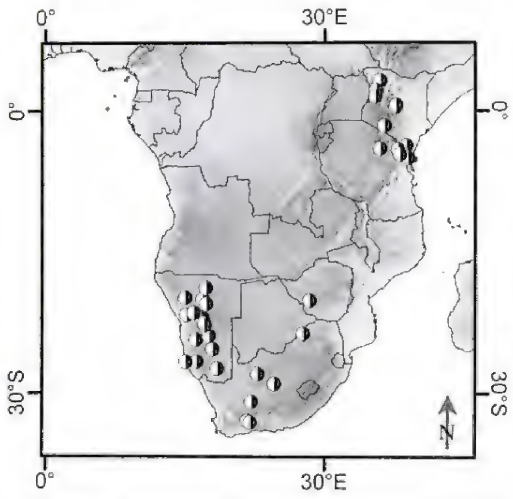

Figure 158. Collecting localities of *Tachysphex gagates*.

Records.— **KENYA**: **Coast Province**: Taita Discovery Centre (1 ♂). **Eastern Province**: 2 km S Archer's Post (2 ♂), 5 km NNE Isiolo (1 ♀, 1 ♂), Ewaso Ng'iro River opposite Archer's Post (1 ♂). **Rift Valley Province**: Archer's Post at Ewaso Ng'iro River (1 ♀, 3 ♂), near W shore of Lake Turkana (1 ♂), Lodwar road 4 km N road to Sigor (1 ♀), 120 km S Lodwar (1 ♀, 10 ♂; 4 ♂, NMK), Magadi road 46 air km SW Nairobi (1 ♀, 9 ♂; 4 ♂, SAM), Marich Pass Field Studies Centre (1 ♀), Olorgesailie (2 ♂). **NAMIBIA**: **Grootfontein District**: 60 km SW Otavi (1 ♀, JG; 2 ♀, MS). **Karasburg District**: Farm Altdorn 3 30 km NE Ai Ais at 27°48′16″S 17°40′02″E (1 ♂, CSE). **Keetmanshoop District**: Noachabeb [Farm] 27 mi NNE Grünau (1 ♀, BMNH). **Khorixas District**: Spitzkopje (1 ♀). **Lüderitz District**: Aus (1 ♀, 3 ♂; 1 ♀, 5 ♂, MS), Lüderitz (3 ♂, MS). **Maltahöhe District**: Naukluft at 24.3°S 16.2°E (1 ♂, CSE). **Mariental District**: 73 km S Mariental (6 ♀, 3 ♂). **Okahandja District**: Okahandja (1 ♂, AMG), Waldau River 17 km W Okahandja (2 ♀, 5 ♂; 2 ♂, NHMZ). **Omaruru District**: Okatjerute-Otjikoko 4 km E Omaruru (1 ♀, NMN). **Otjiwarongo District**: Waterberg (1 ♂, CSE). **Outjo District**: 31 km SE Kamanjab (1 ♂, MS). **Rehoboth District**: 15 km N Kalkrand (4 ♂, MS). **Tsumeb District**: 30 km E Namutoni (1 ♂, MS). **Windhoek District**: Aris (1 ♀), 2 km S Aris (2 ♂), Windhoek (1 ♀, AMG; 1 ♂, FSCA; 1 ♀, 1 ♂, NMN). **SOUTH AFRICA**: **Northern Cape Province**: Carnarvon (2 ♂, AMG), Olifantshoek (1 ♀, 1 ♂, FSCA), Ritchie 50 km SSW Kimberley (2 ♀, OÖLM). **Northern Province**: Ellisras (1 ♂, AMG). **Western Cape Province**: Prince Albert Road (1 ♂, RMNH), Swartrivier 7 km NW Prince Albert (3 ♂). **TANZANIA**: **Arusha Region**: Tarangiri National Park (2 ♂). **Kilimanjaro Region**: 19 km SE Same (1 ♂). **Tanga Region**: 73 km NW Korogwe (5 ♀, 13 ♂; 1 ♀, 2 ♂, CSE; 2 ♂, UDS), 10 km WNW Mabokweni (8 ♀, 8 ♂), 2 km NE Mkomazi (4 ♂; 3 ♂, UDS). **ZIMBABWE**: Kami (1 ♀, SAM, holotype of *gagates*).

Tachysphex gastrotrichus Pulawski, sp. nov.

Figures 159, 160.

Derivation of name.— *Gastrotrichus* is derived from two Greek nouns: *gaster*, stomach, belly, and *trix, trichos*, hair; with reference to the erect setae on tergum I in this species.

Recognition.— *Tachysphex gastrotrichus* has the labrum convex (markedly protruding beyond the clypeal free margin), the galea as long as the scape, the propodeal side ridged, and genal and thoracic setae markedly sinuous. Other species share this combination, but only *gastrotrichus* and *ulothrix* have straight, short setae on the postocellar area (at most slightly longer than the mid-ocellar diameter). The largely glabrous hindfemoral venter is a subsidiary recognition feature. In *gastrotrichus*, however, the setae on the basal declivity of tergum I are erect (these setae may be lost in some old males), and the male forefemur is entire. In *ulothrix*, setae of tergum I are all appressed, and the male forefemur is emarginate. *Tachysphex hadronyx* also has erect setae on tergum I, but differs in having erect, sinuous setae on the postocellar area and many other characters given under that species.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, sparsely punctate, as long as scape. Scutal punctures well defined, averaging 2–3 to several diam-

eters apart on disk (interspaces shiny). Mesopleural punctures well defined, averaging about one diameter apart (interspaces shiny). Propodeal dorsum irregularly ridged; side shiny, conspicuously ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate.

Setae (numbers in parentheses indicate setal length expressed as a fraction of basal mandibular width): fully concealing integument on frons but not on mesopleuron; sinuous on gena, scutum, mesopleuron, propodeum, fore- and midfemoral venters, and on outer surface of female scape; erect on lower gena (0.7–1.0), scutum anteriorly (0.7), and outer side of female scape; inclined on scutum posteriorly, on mesopleuron, and on fore- and midfemora; appressed to suberect on postocellar area, about as long as midocellar diameter; oriented anterad on propodeal dorsum (0.7). Hindfemoral venter asetose except basally. Basal declivity of tergum I, except mesally, with sinuous, suberect setae (up to 0.7).

Head and thorax black, but mandible (except apically), clypeus (except basally), and labrum yellowish red; pronotal lobe yellow posteriorly in some males. Frontal setae silvery in both sexes. Wing membrane hyaline; forewing costal vein light brown, subcostal vein brown. Coloration of femora: see below. Tibiae and tarsi red. Gaster red, but terga III–V or IV and V brown in some males (all terga largely brown in smallest male examined). Terga I–V in female, I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 159a): bevel about as long as basomedian area; lip free margin arcuate, with small, shallow notch mesally, not incised or sinuous laterally. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 3.0–3.3 × apical width. Base of forefemoral venter shiny, impunctate or with minute, sparse punctures. Dorsal foretibial surface with two spines; outer sur-

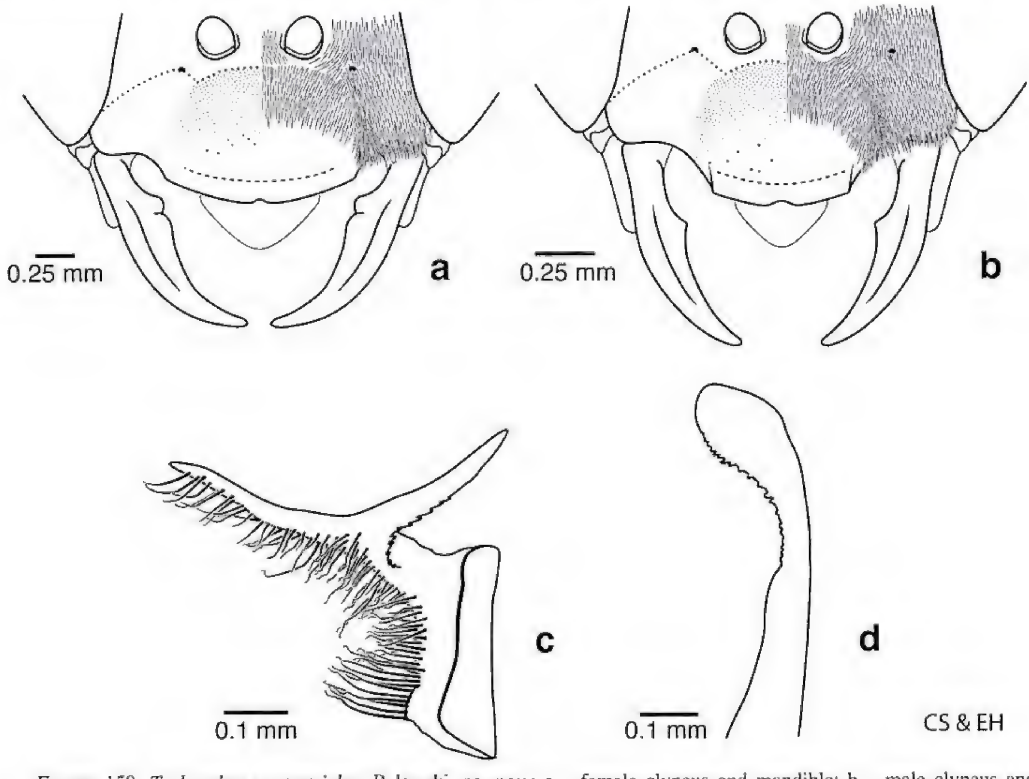

FIGURE 159. *Tachysphex gastrotrichus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

face shiny, sparsely punctate, with two or three spines. Forebasitarsus with eight or nine rake spines. Apical depression of tergum V punctate and setose. Length 7.5–10.0 mm. Femora black, red apically.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 159b): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, straight on each side of emargination, with well-defined corner; distance between corners about 0.9 × distance between corner and orbit. Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 2.0–2.3 × apical width. Base of forefemoral venter impunctate, shiny. Forefemoral venter entire, shiny and impunctate basally. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna III–VI (except laterally) each with transverse, subbasal fringe of agglutinated setae (fringes visible only when the sterna are fully extended). Sternum VIII broadly, shallowly emarginate apically. Length 5.5–8.3 mm. Volsella and penis valve: Figs. 159c, d. Femora red, dorsum black (except apically); hindfemur largely black in some specimens.

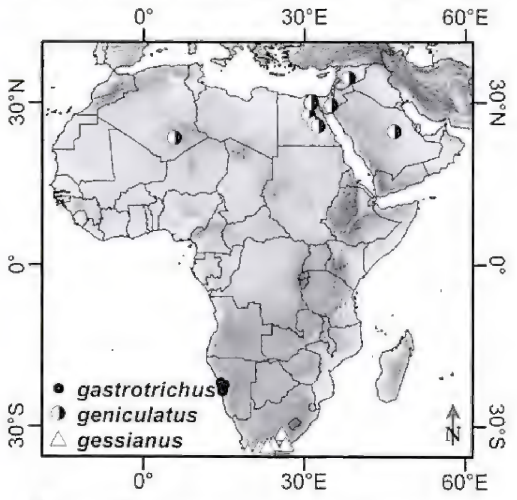

FIGURE 160. Collecting localities of *Tachysphex gastrotrichus*, *geniculatus* and *gessianus*.

GEOGRAPHIC DISTRIBUTION (Fig. 160).— Namib Desert.

RECORDS.— HOLOTYPE: ♂, **NAMIBIA: Swakopmund District**: 10 km E Swakopmund at Swakop River, 23 Feb 1990, WJP (CAS). PARATYPES: **NAMIBIA**: **Swakopmund District**: 20 mi W Gobabeb, 5 Oct 1967, E.S. Ross and A.R. Stephen (1 ♀); 20 km NE Hentiesbaai, 10 Dec 1996, WJP (1 ♀, 31 ♂); 10 km E Swakopmund at Swakop River, 23 Feb 1990, WJP (1 ♂); 63 km NE Swakopmund, WJP, 15 Feb 1996 (2 ♂), 19 Feb 1996 (2 ♂), 15 Mar 1996 (3 ♂), 5 Dec 1996 (2 ♀, 2 ♂); 30 km E Walvis Bay, 23 Jan 1988, R. Miller and L. Stange (2 ♂, FSCA). **Walvis Bay District**: 11 km E Walvis Bay, 7 Dec 1996, WJP (1 ♀, 3 ♂).

Tachysphex geniculatus (Spinola)

Figures 160, 161.

Lyrops geniculata Spinola, 1839:480, ♀. Holotype or syntypes: ♀, Egypt: no specific locality (MSNT), examined.— de Beaumont, 1952b:48 (redescription of holotype or unique surviving syntype); Casolari and Casolari Moreno, 1980:113 (specimen in M. Spinola collection).— As *Larrada geniculata*: F. Smith, 1856:281 (new combination, listed).— As *Tachysphex geniculatus*: Kohl, 1885:395 (new combination, original description copied); Dalla Torre, 1897:680 (in catalog of world Hymenoptera); de Beaumont, 1952a:190 (Algeria); Pulawski, 1964:88 (Egypt), 1971:346 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed); Guichard, 1991:339 (Jordan).

As *Tachysphex* No. 8: de Beaumont, 1940:168, synonymized with *Tachysphex geniculatus* by Pulawski, 1971:346.

INTERPRETATION OF THE SPECIES NAME.— The only specimen of *geniculatus* present in the Spinola collection, Torino, is poorly preserved (covered with dirt, partly squashed, with the gaster reglued to the thorax), but its essential characteristics can be easily recognized. In particular, the anteriorly glabrous propodeal side and the few remaining erect setae on the postocellar area allow unequivocal recognition of the species.

Recognition.— *Tachysphex geniculatus* shares the following unique combination with *horus*, *inextricabilis*, *luxuriosus*, and *niloticus*: labrum markedly convex and protruding beyond the clypeal lip; postocellar area unusually broad: width more than twice length (Figs. 161a, b); female mandible with cleft unusually broad, widely open (Fig. 161c), female clypeus with lip conspicuously emarginate laterally (Fig. 161c); and male forefemur not emarginate. Also, the mesopleuron is coriaceous (integument concealed by vestiture in some species), and the setae are short on the postocellar area (setal length no more than one midocellar diameter) and appressed on tergum I.

In the female of *geniculatus* the setae are erect or nearly so on the postocellar impression and on each side of it and not completely concealing the sculpture beneath the midocellus. In addition, the gaster is all black in many specimens. In *horus*, *inextricabilis*, *luxuriosus*, and *niloticus*, the setae are appressed or nearly so on the postocellar area and fully concealing the integument beneath the midocellus, and the gaster is red at least basally. As in *horus* and *niloticus*, the propodeal side of *geniculatus* is glabrous anteriorly, a subsidiary recognition feature.

The male of *geniculatus* shares with *horus* and *niloticus* the erect setae of the postocellar area and the propodeal side glabrous along the metapleural sulcus (setae of postocellar area appressed and propodeal side all setose in *inextricabilis* and *luxuriosus*). Unlike *niloticus*, the dorsal volsellar process is low, rounded (Fig. 161e) rather than high, narrow (Fig. 250). The integument of most specimens is visible from most angles between the midocellus and antennal socket (all or largely concealed by vestiture in the other four species, at least in the ventral half). The penis valve is thin apically, whereas rounded in the Egyptian specimens of *horus*, but *horus* from other areas are difficult to distinguish.

Description.— Labrum convex, conspicuously protruding beyond clypeal free margin. Galea with punctures several diameters apart, about as long as 0.9 of scape in female, 1.1 in male. Clypeus with short, obtuse carina emerging from lip corner; lip ill defined, forming single convex surface with bevel (at least mesally). Scutal hindcorner more prominent than average for the genus (scutal flange broadening posterad); scutal punctures well defined, averaging from about one diameter to several diameters apart on disk. Mesopleuron coriaceous, dull. Punctures of mesothoracic venter, anterad of each midcoxa, varying from 2–3 (some males) to many diameters apart (punctures about one diameter apart anteriorly and adjacent to midline). Propodeal dorsum dull, coarsely microsculptured, with ill-defined, longitudinal ridges at least basally; side ridged. Hindcoxal dorsum with inner margin not carinate.

Setae erect on postocellar impression and on each side of it in female (suberect in some specimens), on entire postocellar area in male, about as long as midocellar diameter; not concealing integument between midocellus and antennal socket from most angles; erect on each side of oral fossa next to occipital carina and equal to 0.4 of basal mandibular width; suberect on scutum anteriorly and on mesopleuron; variously oriented on propodeal dorsum; propodeal side asetose anteriorly. Sternum I all or largely glabrous.

Head and thorax black, mandible yellowish red mesally in female, brown or yellowish brown mesally in male. Frontal setae silvery in both sexes. Wing membrane hyaline; costal and subcostal veins of forewing light brown. Femora black; tibiae black except reddish basally and apically, hindtibial dorsum, in most specimens, partly to all red, and all tibiae red in a female from Saudi Arabia (Pulawski, 1971). Gaster all black (most specimens) or terga I and II partly or all red, apical depressions of terga translucent. Terga I–V silvery fasciate apically (fascia of tergum V ill defined in some females).

♀.— Mandible: cleft unusually broad, widely open (Fig. 161c). Clypeus (Fig. 161c): bevel about as long as basomedian area; lip free margin straight or arcuate, roundly emarginate laterally. Width of postocellar area 2.2–2.4 × length (Fig. 161a). Dorsal length of flagellomere I 2.4–3.0 ×

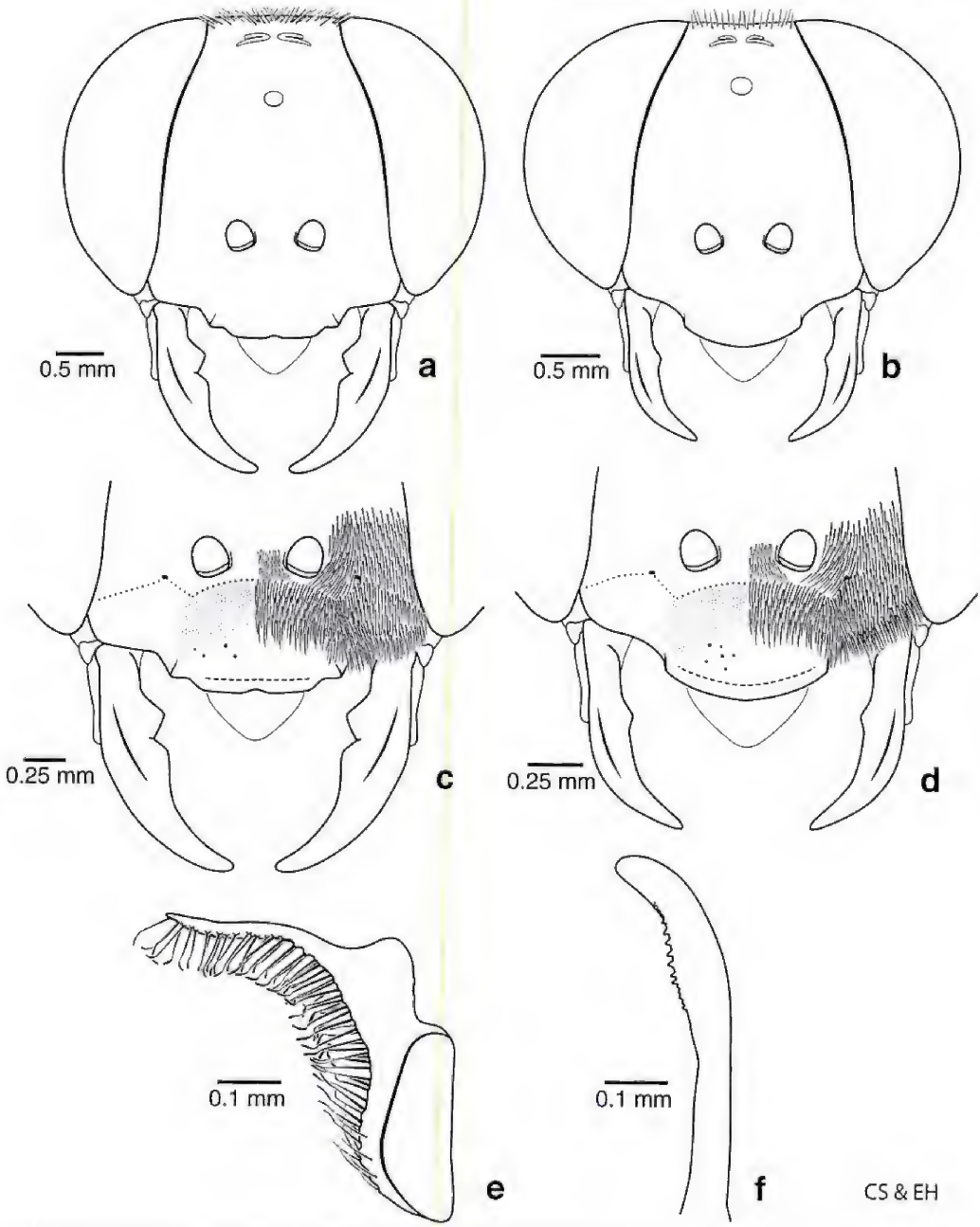

FIGURE 161. *Tachysphex geniculatus* (Spinola): a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

apical width. Midtrochanteral venter with a few, large punctures. Forefemoral base, on anteroventral surface, with a few large punctures that are many diameters apart (interspaces aciculate). Dorsal foretibial surface with three spines; outer surface with one to three spines. Forebasitarsus with 7–9 rake spines. Venters of tarsomeres V each with thin, preapical spine. Sternum I all or largely asetose. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with minute punctures that average many diameters apart (interspaces aciculate to unsculptured); lateral carina effaced near apex, apical margin truncate or slightly convex. Length 7.5–12.5 mm.

♂.— Mandible: trimmal carina with low, obtuse tooth and no cleft. Clypeus (Fig. 161d): bevel and lip ill defined; lip free margin slightly arcuate to nearly straight, with ill-defined corner; distance between corners 1.2–1.3 × distance between corner and orbit. Width of postocellar area 2.3–2.5 × length (Fig. 161b). Dorsal length of flagellomere I 1.7–2.25 × apical width. Forefemur not emarginate. Outer margin of forebasitarsus with 3–6 rake spines; outer apical spine of foretarsomere II mostly longer than tarsomere III, but as long as tarsomere III in some specimens. Sternum VIII emarginate apically, bottom of emargination slightly prominent to slightly incised mesally. Length 6.5–9.5 mm. Volsella and penis valve: Figs. 161e, f.

COLLECTING PERIOD.— The specimen from the Hoggar Mountains, Algeria, was collected between 15 and 30 April, those from Egypt were collected between 3 March and 19 April, and those from Jordan between 6 and 10 March and on 1 April.

GEOGRAPHIC DISTRIBUTION (Fig. 160).— Algeria, Egypt, Jordan, Syria, Saudi Arabia.

RECORDS.— **ALGERIA**: Idjef Mélène in the Hoggar Mountains (de Beaumont, 1952a). **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash (6 ♀, 3 ♂), Ghiza (4 ♀, 2 ♂), Saqqara (9 ♀, 4 ♂). **Al Minya**: Tell el Amarna (11 ♀, 2 ♂). **Al Qahirah** (= Cairo): Gebel Asfar (Pulawski, 1971), Maadi (1 ♀), Wadi Digla (1 ♀). **Al Uqsur** (= Luxor): 3 km W Luxor (3 ♂). **Girga**: Abydos (11 ♀, 7 ♂). **JORDAN**: Aqaba (Guichard, 1991). **SAUDI ARABIA**: El Riyadh (Pulawski, 1971). **SYRIA**: Palmyra (Pulawski, 1971).

Tachysphex georgii Arnold

Figures 162–164.

Tachysphex georgii Arnold, 1940:122, ♀ (as *Georgii*, incorrect original capitalization). Holotype: ♀, South Africa: Western Cape Province: George (TMP), examined .— Bohart and Menke, 1976:274 (listed).

RECOGNITION.— *Tachysphex georgii* has the labrum convex and markedly protruding beyond the clypeal free margin, galea about as long as the scape, propodeal side unridged to finely ridged, at least terga I–III silvery fasciate apically, setae appressed on the postocellar area and scutum, oriented posterad on the propodeal dorsum apicomesally, and shorter than the midocellar diameter adjacent to hypostomal carina. The female differs from similar African species in having tergum V punctate and setose throughout (including the apical depression) in combination with all black femora and at least hindtibiae. The male can be recognized by the black femora and the forefemoral notch either unsculptured and glabrous or with sparse, microscopic punctures and setae (Fig. 163); also the tibiae, at least the hindtibia, are black in many specimens. In similar African species, the forefemoral notch is densely, microscopically punctate and setose and at least the tibiae are red (all or partly). Subsidiary recognition features of the male *georgii* are: foretarsal rake well developed, dorsal volsellar process long, narrow (Fig. 162c).

SIMILAR UNASSIGNED SPECIMENS.— Two ♀ from Nigeria (BMNH) are identical, including all black tibiae, but they are likely to be a different species.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea closely punctate, as long as 0.9 of scape in female, 1.1 in male. Scutal punctures about one diameter apart, some punctures 2–3 diameters apart in many males. Mesopleuron dull, uniformly microsculptured.

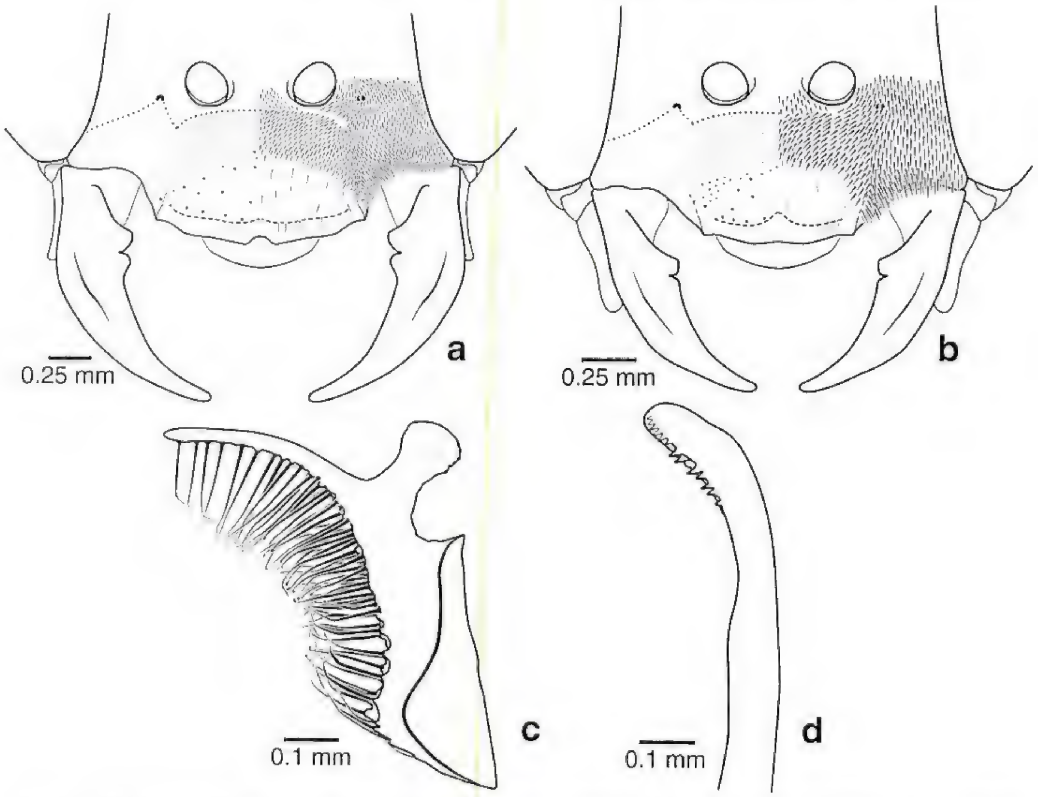

FIGURE 162. *Tachysphex georgii* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Propodeal dorsum evenly areolate; side dull, finely microsculptured, finely ridged anteriorly in most specimens, finely ridged throughout in some. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect on each side of oral fossa next to occipital carina, shorter than midocellar diameter; appressed on postocellar area and scutum; oriented posterad on propodeal dorsum except oriented anterad basomedially.

Head and thorax black, mandible reddish mesally. Frontal setae with golden tinge in female (at least dorsally), golden in male (silvery adjacent to antenna in many specimens). Wing membrane slightly infumate (moderately so in some females); costal vein of forewing brown, subcostal vein black. Femora black; tibiae all black or inner foretibial surface red, but all tibiae red except hindtibia partly darkened in some males from Marich Pass area, Kenya. Terga I–III red in most females, but largely black in one specimens from South Africa (remainder black); in male terga I and II red (also part of III in some Kenyan specimens) or (many South African specimens) all gaster black. Terga I–III silvery fasciate apically (I–V in Kenyan females).

♀.— Clypeus (Fig. 162a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, sinuous laterally. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.4–2.6 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two or three spines. Forebasitarsus with 8–10 rake spines. Apical spines of hindtarsomere IV reaching claw bases. Apical depression of tergum V punctate throughout. Pygidial plate with well-

defined punctures that average several to many diameters apart, at least mesally. Length 10.0–12.0 mm.

♂.— Mandible: trimmal carina with tooth, with or without cleft. Clypeus (Fig. 162b): bevel longer than basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin arcuate (nearly straight in some specimens), emarginate mesally, with well-defined corner; distance between corners 1.1–1.3 × distance between corner and orbit in most specimens, but 0.9 in single male from Cederberg, South Africa. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.0–2.2 × apical width. Forefemoral notch shiny, either unsculptured and glabrous or with sparse, microscopic punctures and setae (Fig. 163). Outer margin of forebasitarsus with 4–6 rake spines. Outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Sternum VIII evenly, shallowly emarginate apically. Length 7.8–10.1 mm. Volsella and penis valve: Figs. 162c, d.

FIGURE 163. *Tachysphex georgii* Arnold, male: bottom of forefemoral notch.

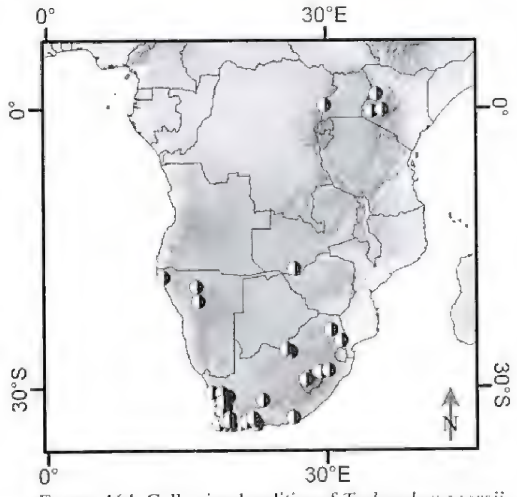

FIGURE 164. Collecting localities of *Tachysphex georgii*.

PREY.— A female from Hilton Farm, South Africa (AMG) is pinned with her prey, an acridid nymph (det. F.W. Gess).

GEOGRAPHIC DISTRIBUTION (Fig. 164).— Uganda, Kenya, Lesotho, Zambia, Namibia, South Africa.

RECORDS.— **KENYA**: **Eastern Province**: Pt. Hall to Embu road (1 ♂, BMNH). **Nyanza Province**: Papenditi (1 ♂). **Rift Valley Province**: Marich Pass Field Studies Centre (17 ♀, 34 ♂), Marich Pass area 4 km N road to Sigor (1 ♀, 5 ♂),), Ol Punyata ca 16 mi N Nakuru at 0°08′S 36°05′E (1 ♂, LACM). **LESOTHO**: Leribe at Hensley's Dam (1 ♀, AMG), Mamathes (1 ♀, 1 ♂, AMG), Teyateyaneng (1 ♀). **NAMIBIA**: **Opuwo District**: Anabib (Orupembe) 100 mi W Opuwo (1 ♂, ZMLU). **Otjiwarongo District**: 18 km NE Kalkfeld (1 ♂). **Outjo District**: Gemsbokvlakte in Etosha National Park (1 ♂, NMN). **SOUTH AFRICA**: **Eastern Cape Province**: Clifton Farm 18 km NW Grahamstown (1 ♀, AMG), 18 km WNW Grahamstown: Hilton Farm (2 ♀, AMG), Table Farm 10 km NW Grahamstown (1 ♂, AMG). **Free State**: Harrismith (1 ♀, 1 ♂, BMNH). **Kwazulu-Natal**: Dundee (1 ♂, AMG), Van Reenen (1 ♀, BMNH). **Mpumalanga**: Skukuza in Kruger National Park (3 ♀, PMA). **Northern Cape Province**: 40 km W Garies (1 ♂, OÖLM), 50 km W Loeriesfontein (2 ♂, OÖLM), SW Loeriesfontein (1 ♂, OÖLM) , Victoria West (1 ♂, AMG). **Northern Province**: Beacon Ranch 20 km NW Gravelotte (1 ♂, AMG). **North-West Province**: Lichtenburg (1 ♂, TMP), Mafeking (1 ♂, BMNH). **Western Cape Province**: Bains Kloof in Wit River Valley (1 ♂, SAM), Barrydale (2 ♂, OÖLM), Bulshoek between Klawer and Clanwilliam (1 ♀, SAM), Caleta Cove at Clanwilliam Dam at 32°14′20″S 18°55′45″E (1 ♂, AMG), Cape (1 ♂, BMNH ex F. Smith coll.), Cape Peninsula: Camps Bay (1 ♂, BMNH), Cape Town: Kirstenbosch Botanical Garden at 33°59′S 18°26′E (3 ♂), Cederberg 15–30 km SE Clanwilliam (1 ♂, USU), Ceres (1 ♀, BMNH), Citrusdal District (2 ♀, 1 ♂, SAM), 21.5 km ENE Clanwilliam at 32°04′45″S 19°05′00″E (1 ♂, CSE), Clanwilliam Dam

at 32°11′50″S 18°53′42″E (1 ♂, AMG), 31.5 km from Clanwilliam on road to Klawer (1 ♂, AMG), Du Toit's Kloof (1 ♀, BMNH), George (1 ♀, TMP, holotype of *georgii*), Greyton (4 ♂, ÖLM), Hottentots 40 mi from Cape Town (1 ♂, BMNH), Klein [= Little] Karoo SE Groot River (1 ♂, ÖLM), Kliprand 60 km W Loeriesfontein (1 ♂, OÖLM), Montagu (1 ♂, BMNH), 10 km N bridge on Olifants River on road to Vanrhynsdorp (1 ♀, AMG), Oudtshoorn (1 ♂, AMG), Pakhuis Pass (2 ♂; 5 ♂, UCD), E of Pakhuis Pass (1 ♂), Paleisheuwel (1 ♀, SAM), Sea Point (1 ♂, BMNH), Swartberg Pass (1 ♂, SAM), near Swartberg Pass ca 1450 m at 33°20′S 22°02′E (3 ♂), 10 km NE Vanrhynsdorp (2 ♂; 7 ♂, OÖLM), Wellington: Rooshock (3 ♀, 8 ♂; 4 ♀, 10 ♂, RMNH), Witzenberg Valley in Ceres District (2 ♂, BMNH), Worcester (1 ♀, UCD). **UGANDA**: Lake Edward (1 ♀, BMNH). **ZAMBIA**: 100 km NE Livingstone (1 ♂, OÖLM).

***Tachysphex gessianus* Pulawski, sp. nov.**
Figures 160, 165.

Derivation of name.— *Gessianus* is a Neolatin masculine adjective derived from the last name of Frederick W. Gess and Sarah K. Gess in recognition of their work on South African wasps and as a sign of gratitude for their hospitality and unselfish help during this study.

Recognition.— *Tachysphex gessianus*, an endemic of South Africa, has an all black gaster (also the legs are black in the female and many males), an essentially flat labrum (insignificantly protruding beyond the clypeal free margin), galea slightly longer than wide in lateral view, hindwing crossvein cu-a vertical, and apical tarsomeres without ventral spines. Also, the mesopleural punctures are markedly sparser below scrobe than above, the propodeal dorsum is evenly microareolate, the propodeal side not ridged, and the setae are appressed on the postocellar area (shorter than the midocellar diameter) and oriented posterad on the propodeal dorsum.

In addition to the above, the female of *gessianus* can be recognized by the combination of two features: the fore- and midfemoral posteroventral surfaces with only a few setigerous punctures (hence nearly glabrous) and flagellomeres III–VIII with well-defined sensory areas. Also, the tarsi are slightly shortened (e.g., length of midtarsomere II 1.9–2.0 × apical width, length of tarsomeres IV equal to width). The female of *karoo* is similar, but lacks a sensory area on flagellomere III and the sensory areas on flagellomeres IV–VIII are ill defined.

In the the male, the forefemur may be either impunctate ventrally or (most specimens) densely, uniformly punctate. The forebasitarsus has no preapical spines on the outer margin, the clypeal lip is obtusely pointed, with well-defined corner (Fig. 165b), and the sternal setae are fully appressed. *Tachysphex barkeri*, *brachypus*, and *eurystoma* share these characteristics, but they have an unusually short flagellomere I whose ventral length is slightly less than apical width (Fig. 55c). In *gessianus*, this flagellomere's ventral length slightly exceeds its apical width. Also, the clypeal lip of *gessianus* is more prominent than in the other three (compare Figs. 165b, 54b, and 136b). Specimens with red legs resemble *ovambo*, *paulus*, and *saevus*, but differ in having a longer clypeal lobe (midlength about 1.2 × distance between lip corner rather than about 1.0) and the dentate portion of the penis valve expanded basally (Fig. 165d) rather than simple.

Description.— Labrum flat except for narrow distal portion that is curved toward head's posterior face (insignificantly so in male). Galea slightly longer than wide in lateral view, about as long as 0.8 of scape. Scutal punctures: see below. Mesopleural punctures well defined to evanescent, several diameters apart below scrobe, interspaces microsculptured, somewhat shiny to dull. Episternal sulcus complete in female, incomplete in male. Propodeal dorsum evenly microareolate, side microsculptured, with minute punctures that are several diameters apart. Hindcoxal dorsum with inner margin carinate basally. Sternum I with median carina apically.

Setae slightly longer than midocellar diameter on each side of oral fossa next to occipital carina; appressed on postocellar area, scutum, and midfemoral venter; oriented posterad on propodeal dorsum.

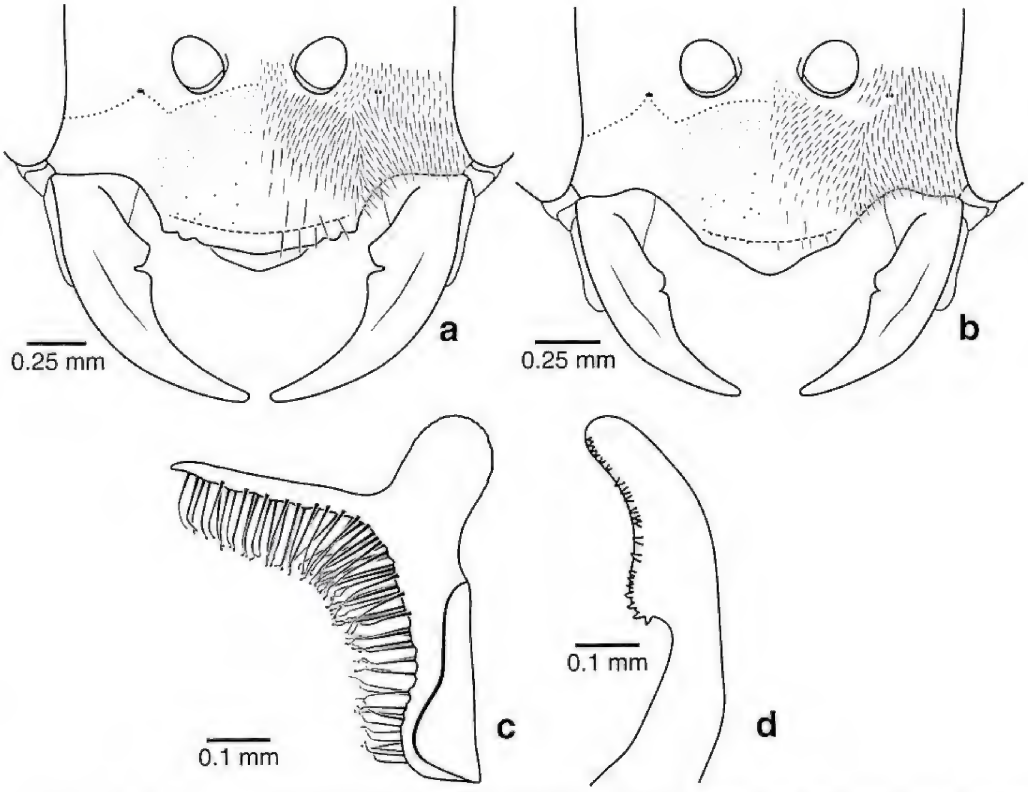

FIGURE 165. *Tachysphex gessianus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Head, thorax, and gaster black, mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane infumate; costal and subcostal veins of forewing brown. Legs black in female and most males (tarsal apex reddish in male), but partly red in two males from Pearly Beach: foretibial inner margin and mid- and hindtibial bases red in one; all femora, tibiae, and tarsi red in the other (fore- and hindfemora somewhat darkened basally). Terga I–III silvery fasciate apically (fascia evanescent on tergum III in females and some males from Pearly Beach).

♀.— Labrum free margin arcuate. Clypeus (Fig. 165a): bevel longer than basomedian area; lip free margin arcuate or somewhat pointed mesally, with two lateral incisions on each side (inner incision inconspicuous in some specimens). Width of postocellar area 1.3 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width; flagellomeres III–VIII with well-defined sensory areas; length of flagellomere VIII 1.5 × width. Scutal punctures of two sizes: small punctures that average about one diameter apart near margins and up to 2–3 diameters on disk; and somewhat larger punctures that are many diameters apart. Fore- and midfemoral posteroventral surfaces finely microsculptured, with setigerous punctures that are many diameters apart. Dorsal foretibial surface with one or two spines; outer surface with narrow, glabrous zone and two or three bristles. Tarsi shortened: length of fore- and midtarsomeres II 1.2 and 1.9–2.0 × apical width, respectively; that of midtarsomere III 1.2 × apical width, and tarsomeres IV of all legs as long as wide. Forebasitarsus with 10–12 rake spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that are up to many diameters apart on disk. Length 8.8–11.3 mm.

♂.— Mandible: trimmal carina with tooth and cleft (Fig. 165b). Clypeus (Fig. 165b): bevel shorter than basomedian area; lip free margin obtusely pointed (longer at midpoint than laterally), with well-defined corner; distance between corners 0.9 × distance between corner and orbit. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.3–1.4 × apical width. Scutal punctures about one diameter apart. Forefemoral venter densely, uniformly punctate in most specimens, but impunctate in some, notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length 8.3–8.8 mm. Volsella and penis valve: Figs. 165c, d.

Floral records.— One of the females from Hilton Farm was collected on flowering *Maytenus linearis* L. f. Marais (Celastraceae), and the females from Koonap River area were collected on flowering *Ziziphus mucronata* Willdenow (Rhamnaceae), as recorded by the collectors.

Geographic distribution (Fig. 160).— Southern South Africa.

Records.— Holotype: ♀, **SOUTH AFRICA**: **Eastern Cape Province**: 18 km WNW Grahamstown: Hilton Farm, 6 Dec 1964, C. Jacot-Guillarmod (AMG). Paratypes (CJG = C. Jacot-Guillarmod, ISP = M.E. Irwin, E.I. Schlinger and F.D. Parker, FWG = F.W. Gess): **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay, date illegible, H. Brauns (1 ♂; 1 ♂, TMP); Colchester at 33°42′S 25°50′E, 5 Jan 1997, WJP (1 ♀); Elandsheuwels Farm 40 km W Steytlerville, 18–22 Nov 1999, ISP (2 ♂, CAS, USU); 17 mi NW Grahamstown, 21–23 Nov 1966, J.D. Rozen and D.J. Brothers (1 ♀, AMNH); 18 km WNW Grahamstown: Hilton Farm, 1–16 Jan 1971, FWG (1 ♀, 1 ♂, AMG), 16 Jan 1996, WJP (1 ♀), 20–30 Nov 1970, FWG (1 ♂, AMG), 2–5 Dec 1979, FWG (1 ♂, AMG), same data as holotype (1 ♀), 7–11 Dec 1979, FWG (1 ♀, AMG), 19–31 Dec 1970, FWG (1 ♀, AMG), 6 and 20 Dec 1977, FWG (2 ♀, AMG), 16–22 Dec 1979, FWG (1 ♀, 1 ♂); Howison's Poort 6 km WSW Grahamstown, 8–14 Dec 1971, FWG (1 ♂); Koonap River 17 km from Adelaide on the Grahamstown road, 20–22 Dec 1972, CJG (1 ♀; 1 ♀, AMG); Steynsburg, 1915, R. Ellenberger (1 ♀, MNHN); 6 km N Steytlerville, 16–23 Nov 1999, ISP (1 ♂; 1 ♀, 1 ♂, USU); Strowan Farm 5 air km W Grahamstown, 19 Nov 1967, CJG (1 ♀) and 8 Jan 1969, FWG (1 ♀, AMG); Willowmore, 1 Jan 1920, H. Brauns (1 ♂, TMP); 37 km NW Willowmore in Grootrivierberg Range, 19–24 Nov 1999, ISP (1 ♀, 2 ♂; 2 ♀, 5 ♂, USU). **Western Cape Province**: Langberg, 15 Dec 2002, Marek Halada (1 ♀, OÖLM); Mossel Bay, R.E. Turner, 18–30 Nov 1921 (1 ♂, BMNH), Dec 1921 (1 ♂, BMNH); Pearly Beach, Dec 1958, S[outh] A[frican] M[useum Staff] (2 ♂; 2 ♀, 3 ♂, SAM); Uniondale, Jan 1979, CDE (2 ♀, CAS, PPRI).

Tachysphex glaber Kohl

Figures 166, 167.

Tachysphex glaber Kohl, 1906:217, ♀ (erroneously mentioned as ♂ on p. 218). Lectotype: ♀, Yemen: Abd el Kuri Island (NHMW), **here designated**, examined.— Bohart and Menke, 1976:274 (listed); Dollfuss, 1989:13 (type material in NHMW).

Recognition.— *Tachysphex glaber*, known only from Abd el Kuri Island, has an all black body, setae sinuous and erect on the postocellar area and propodeal dorsum and suberect on the midfemoral venter, and nonfasciate terga. The southern African species *crassipes* and *punctatiformis* are similar, but in the female of *glaber* (the male is unknown) the free margin of the clypeal lobe is neither emarginate mesally nor incised laterally, whereas one or both of these conditions are found in the other two species.

Description (female only).— Scutal and mesopleural punctures well defined, large, averaging several diameters apart on scutal disk and more than one diameter apart below mesopleural scrobe. Propodeal dorsum irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate.

Setae erect, sinuous on postocellar area (Fig. 166a), scutum, on each side of oral fossa next to occipital carina, and on propodeal dorsum; sinuous and suberect on midfemoral venter. Setal length compared to basal mandibular width: about 0.8 on postocellar area and next to oral fossa, about 0.5

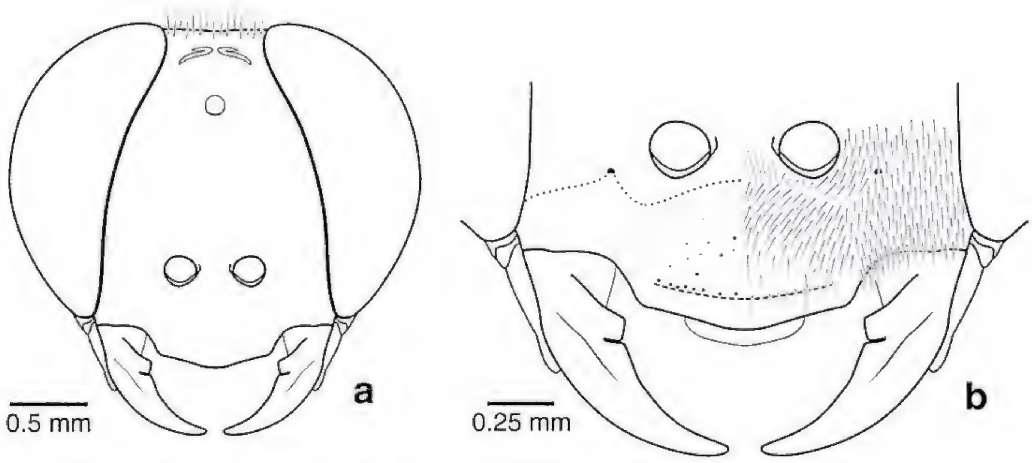

FIGURE 166. *Tachysphex glaber* Kohl: a – head in frontal view; b – clypeus and mandible.

on scutum anteriorly and on propodeal dorsum.

Head, thorax, gaster, and legs black, mandible narrowly dark reddish at two thirds of its length. Frontal setae silvery in female. Wing membrane almost hyaline, veins dark brown. Terga without silvery apical fasciae.

♀.— Clypeus (Fig. 166b): bevel about as long as basomedian area; lip free margin arcuate, not emarginate mesally nor incised laterally. Width of postocellar area 1.2 × length (Fig. 166a). Dorsal length of flagellomere I 2.4–2.6 × apical width. Forecoxa with short but well-defined apicomedian process. Punctures of forefemoral venter mostly many diameters apart except basal punctures close to each other. Foretibial outer surface with one spine. Forebasitarsus with six or seven rake spines. Apical depression of tergum V impunctate, glabrous, shiny. Pygidial plate with punctures that average many diameters apart, interspaces all aciculate or unsculptured near apex. Length 6.9–8.9 mm.

♂.— Unknown.

COLLECTION PERIOD.— The only known specimens, four females, were collected in January 1899.

GEOGRAPHIC DISTRIBUTION (Fig. 167).— Abd el Kuri Island (between Socotra and Somalia).

RECORDS.— YEMEN: Abd el Kuri Island: no specific locality (4 ♀, NHMW).

Tachysphex gracilicornis Mercet

Figures 167, 168.

Tachysphex gracilicornis Mercet, 1909:194, ♀, ♂. Syntypes: Morocco: Melilla (IEE, Madrid), not examined.— Nadig, 1933:78 (Morocco, diagnostic characters); de Beaumont, 1940:165 (in revision of Egyptian *Tachysphex*), 1947a:165 (in revision of Egyptian *Tachysphex*), 1955:178 (Morocco), 1956a:196 (Libya), 1960b:237 (Libya); Pulawski, 1971:305 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed).

Tachysphex eduardi Morice *in* E. Saunders, 1910:527, ♂, ♀ (as *Eduardi*, incorrect original capitalization). Syntypes: Algeria: Biskra (OXUM), not examined. Synonymized with *Tachysphex gracilicornis* by de Beaumont, 1947a:165.— Morice, 1911:103 (Algeria); von Schulthess, 1926:215 (Tunisia, as *Edwardi*).

Tachysphex gracilicornis baal Pulawski, 1971:307, ♀, ♂. Holotype: ♀, Israel: Beersheba (H. Bytinski-Salz collection, now Tel Aviv University), examined before 1971. **New synonym.**— de Beaumont, Bytinski-Salz, and Pulawski, 1973:10 (Israel); Bohart and Menke, 1976:274 (listed).

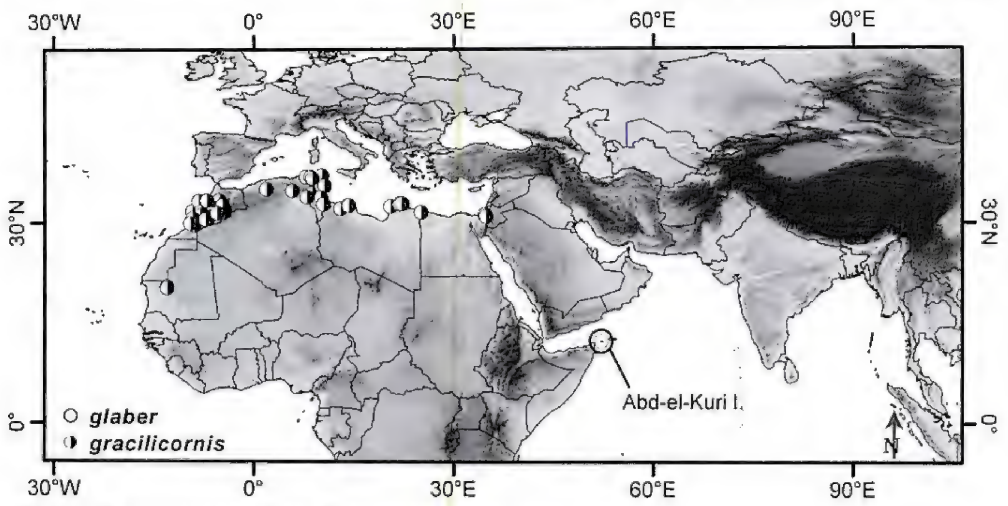

FIGURE 167. Collecting localities of *Tachysphex glaber* and *gracilicornis*.

RECOGNITION.— *Tachysphex gracilicornis* is one of the species in which the labrum is markedly convex and protruding from beneath the clypeus, and the galea is markedly longer than wide. It differs in having the following combination: femora all black or nearly so, terga without silvery, apical fasciae, wings markedly infumate, setae of propodeal dorsum oriented posterad (except basally), forefemur densely, uniformly microsculptured, and the male foretarsus without preapical rake spines. In addition, the propodeal side is ridged in many specimens (but unridged in some).

JUSTIFICATION OF NEW SYNONYMY.— I previously recognized a subspecies *gracilicornis baal* for the specimens from Israel. The current reexamination of the Israeli material and comparison with additional material from other areas convinced me that they differ no more from other populations than these populations differ from each other. I think now, therefore, that formal recognition of subspecies within *gracilicornis* is unnecessary, and I synonymize *baal*.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea micropunctate except anteriorly (some punctures less than one diameter apart, others markedly more), as long as 0.9–1.1 of scape. Scutal punctures averaging less than one diameter apart, interspaces dull. Mesopleuron dull, microareolate, with ill-defined, superficial punctures. Propodeal dorsum evenly microsculptured; side all ridged in many females and some males, but unridged anteriorly and/or mesally in many specimens, or all unridged (particularly in males). Hindcoxal dorsum with inner margin carinate basally.

Setae erect on each side of oral fossa next to occipital carina, slightly shorter than midocellar diameter; appressed on postocellar area, scutum, and midfemoral venter; oriented posterad on propodeal dorsum (except basally).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in male. Wing membrane markedly infumate; costal vein of forewing brown and subcostal vein black (most specimens), or light brown and brown, respectively. Femora all black except for a preapical reddish streak in Mauritanian specimens (on dorsum in female, on outer side in male) and for red apex in some Israeli males. Tibiae in female all black except for red foretibial inner surface (at least partly so); in male varying from all black (except for red foretibial inner surface) to all red; tarsi brown to red. Gaster with segments I–III red and remainder black in most specimens, but pygidial

plate red basally in Tunisian females, segment VI red in female from El Kala, Algeria, and gaster all red in female from Terjit, Mauritania (gaster red with darker tip in male from Terjit). Terga without silvery, apical fasciae.

♀.— Clypeus (Fig. 168a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, sinuous laterally. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 1.8–5.0 × apical width. Forecoxa with small apicomedian process in largest specimens. Dorsal foretibial surface with two or three spines; outer surface with two or three preapical spines, mostly densely setose, but sparsely setose in some Moroccan specimens, and asetose in Israeli specimens. Forebasitarsus with 7–10 rake spines. Apical spines of hindtarsomere IV long, reaching claw base. Apical depression of tergum V varying from setose to asetose (even within specimens from the same country, e.g., Morocco). Pygidial plate with punctures that are many diameters apart mesally but may be less than one diameter apart adjacent to margin. Length 10.5–14.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 168b): bevel nearly as long as basomedian area to markedly longer, delimited anterolaterally by obtuse carina that emerges from lip corner; lip free margin arcuate, entire or emarginate mesally, with well-defined corner; distance between corners 0.9–1.1 × distance between corner and orbit. Width of postocellar area 0.4–0.7 × length. Dorsal length of flagellomere I 1.8–3.3 × apical width. Forefemoral notch smaller and shallower than average for genus, microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II at least slightly shorter than this tarsomere's width. Hindfemoral venter with inner (= posterior) margin sharp in distal half in some specimens. Length 6.8–11.0 mm. Volsella and penis valve: Figs. 168c, d.

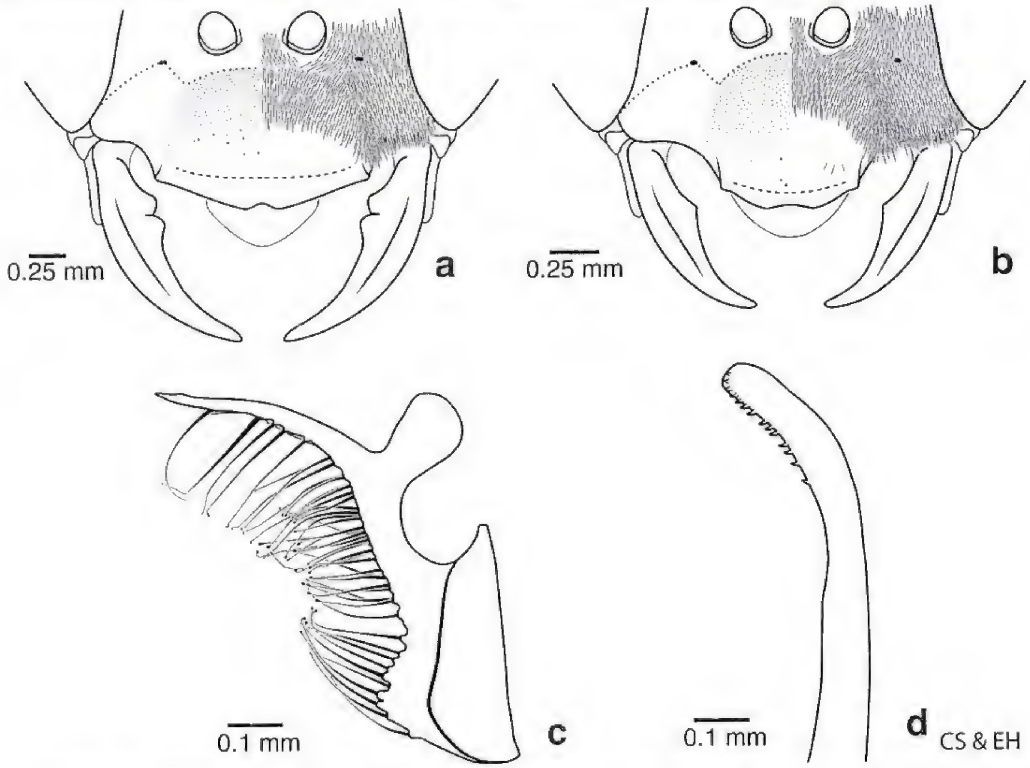

FIGURE 168. *Tachysphex gracilicornis* Mercet: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

VARIATION.— Antennal flagellum varies greatly in length. For example, length to width ratio of female flagellomere IV is 5.0 (Mauritania), 3.0–3.4 (Algeria and Morocco), and 2.5–3.0 (Israel). In the male, the ratio is, respectively, 2.4–3.3 (Mauritania, Tunisia), 2.4–2.6 (Morocco, Algeria), 3.0 (Libya), and 1.8–2.0 (Israel).

PREY.— A female from Homs, Libya, was collected with her prey, a nymph of a *Sphodromerus* sp., an acridid (de Beaumont, 1960b).

GEOGRAPHIC DISTRIBUTION (Fig. 167).— Morocco to Mediterranean coast of Egypt amd Sinai, south to Mauritania.

RECORDS (from Pulawski, 1971, if the number of specimens examined or a bibliographic source is not indicated).— **ALGERIA**: Annaba (Morice, 1911, as Bône), Biskra (Saunders, 1910), El Kala (1 ♀), Nemours (1 ♂). **EGYPT**: **Matruh**: NW Solum (de Beaumont, 1947). **Sina** (=Sinai): Wadi el Lega (Roche and Zalat, 1994). **ISRAEL** (all paratypes of *gracilicornis baal*): Beersheba (2 ♀, 1 ♂), Bir Rehme (1 ♂). **LIBYA** (de Beaumont, 1960b, if not indicated otherwise): **Cyrenaica**: Apollonia, Bersis, Cyrene, Gasr Shahaden (1 ♂), Latroun, Ras el Hillal. **Tripolitania**: Garian Hills (de Beaumont, 1956a), Homs. **MAURITANIA**: Tayart 7 km W Atar (1 ♀, 1 ♂, MSNT), Terjit 15 km S Atar (1 ♀, 1 ♂). **MOROCCO** (from de Beaumont, 1955, if not indicated otherwise): Agadir (1 ♀, 1 ♂), Amismiz, Anezal 30 km W Ouarzazate (1 ♂, CSE), Aoulouz, Asni in Moyen Atlas (1 ♀), Assaka, Azemmour (1 ♀, 3 ♂), Azrou (1 ♂), Beni Mellal, Djebel Ayachi in Haut Atlas (Pulawski, 1971), Goundafa (Nadig, 1933), Ijoukak, Ksar es Souk, Marrakech (Pulawski, 1971), Melilla (Pulawski, 1971), Midelt (1 ♂), Ouarzazate (1 ♂, CSE), 10 km SE Ouarzazate (2 ♂, CSE), 40 km SW Ouarzazate (1 ♂, CSE), Quirgane S Arni in Haut Atlas (1 ♂), Tafraout (1 ♂), Tassademt in Agadir area (2 ♂), 10 km W Tazenakht in Anti-Atlas (1 ♂, CSE), Tifermit, Tinerhir, Tiznit: Oued Massa (2 ♂). **TUNISIA**: Beni Kheddache 40 km W Medenine at 33°15′N 10°15′E (1 ♀), Chenini (4 ♀, SCHL), Gafsa (von Schulthess, 1926), Ghar el Melh at 37°10′N 10°13′E (1 ♀, CSE), Kairouan (1 ♂), Matmata (1 ♂, MS), 12 km W Matmata at 33°32′N 9°50′E (1 ♀, CSE), Nefta (1 ♀, SCHL), 5 km N Sidi Bou Goubrine at 35°36.3′N 10°36.0′E (1 ♂, CSE), 25 km S Tabarka (1 ♂, CSE), Tamelest (1 ♀, SCHL).

Tachysphex gracilitarsis Morice

Figures 169, 170.

Tachysphex gracilitarsis Morice *in* E. Saunders, 1910:572, ♀. Lectotype: ♀, Algeria: Biskra (OXUM), designated by Pulawski, 1971:335, reexamined in 2004.— Morice, 1911:103 (Algeria:); von Schulthess, 1926:214 (Tunisia, Libya); Guiglia, 1934:304 (Libya); Giner Marí, 1945b:362 (Western Sahara); de Beaumont, 1947c:663 (as *Tachysphex pygidialis* ssp. *gracilitarsis*; redescription); Pulawski, 1971:334 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed); Gayubo, 1984a:96 (Spain); Gayubo and Mingo, 1988:79 (Spain); Schmidt and Bitsch *in* Bitsch et al., 2001:251 (in Sphecid Fauna of Western Europe).

RECOGNITION.— *Tachysphex gracilitarsis*, known only from Biskra, Algeria, is one of many species in which the labrum is convex and conspicuously protruding beyond the clypeal free margin and the galea is longer than wide in profile (length equal to 0.8 of scape). Additionally, the scutal punctures are less than one diameter apart, the propodeal dorsum is all setose (setae oriented posterad), and the apical depression of tergum V is impunctate, glabrous. The female (the male is unknown) is characterized by a laterally sinuous clypeal lip (Fig. 169), setae on each side of oral fossa next to occipital carina about 1.5 × midocellar diameter, and tergum V with minute punctures that average many diameters apart.

SEX ASSOCATION.— The males that Pulawski (1971) associated with the females of *gracilitarsis* are not conspecific: the setae adjacent to the oral fossa next to the occipital carina are about as long as midocellar diameter and median setae of the propodeal dorsum are oriented obliquely anterad or toward the midline. Their identity remains unknown.

DESCRIPTION (female only).— Labrum convex, markedly protruding from beneath clypeus.

Galea with minute punctures that are several diameters apart, its length equal to 0.8 of scape. Scutal punctures less than one diameter apart. Mesopleuron microsculptured. Propodeal dorsum evenly microareolate; side microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae on each side of oral fossa next to occipital carina about 1.5 × midocellar diameter; appressed on postocellar area and scutum; fully obscuring mesopleural integument; oriented posterad on propodeal dorsum.

Head black except the following are reddish: clypeal bevel, ventral half of lateral clypeal section, labrum, basal two thirds of mandible, and scape. Frontal setae silvery in female. Thorax black, but pronotum partly, pronotal lobe, and part of mesothoracic venter reddish in one specimen. Wing membrane infumate; costal vein of forewing reddish brown, subcostal vein dark brown. Parts of coxae, trochanters, femora, tibiae and tarsi red (fore- and midcoxal dorsum black in basal half or so in one specimen). Gastral terga essentially red, but with irregular black spots covering most of surface. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 169): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, straight or broadly emarginate laterally. Width of postocellar area 0.7 × length. Dorsal length of flagellomere I 2.8–3.1 × apical width. Foretibial outer surface with two spines. Forebasitarsus with seven rake spines. Inner apical spines of hindtarsomere IV nearly reaching claw base. Tergum VI with minute punctures that average many diameters apart; apical depression impunctate, glabrous. Pygidial plate with minute punctures that are many diameters apart; interspaces unsculptured. Length 10.0–12.5 mm.

♂.— Unknown.

Collecting period.— The type series of *gracilitarsis* was collected on 6 June 1898.

Geographic distribution (Fig. 170).— Known from Biskra, Algeria. Records from other localities are uncertain and probably wrong.

Records.— ALGERIA: Biskra (4 ♀, OXUM, lectotype and paralectotypes of *gracilitarsis*).

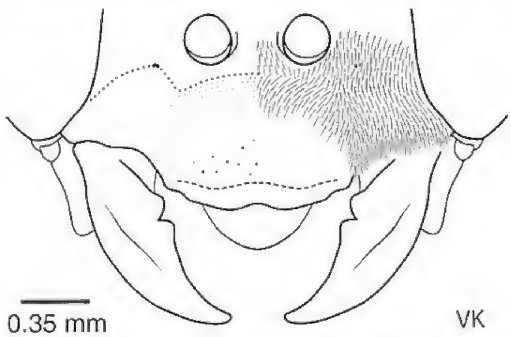

Figure 169. *Tachysphex gracilitarsis* Morice, female: clypeus and mandible.

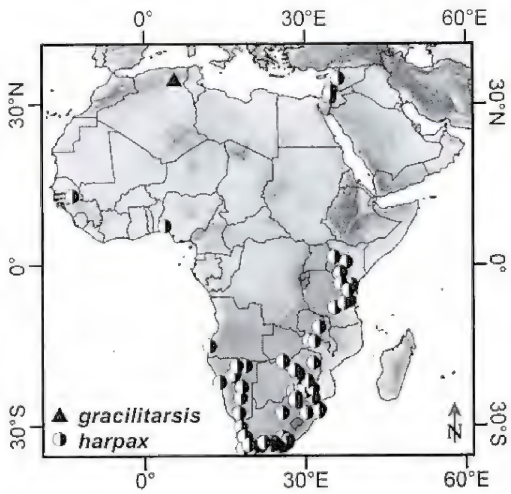

Figure 170. Collecting localities of *Tachysphex gracilitarsis* and *harpax*.

Tachysphex grandissimus Gussakovskij

Figures 171, 172.

Tachysphex grandissimus Gussakovskij, 1933:282, ♀, ♂ (♂ = *Tachysphex sordidus*). Lectotype: ♀, Iran: Baluchestan va Sistan: Bampur-Kaskin (ZIN), designated by Pulawski, 1971:422, examined before 1971.— de Beaumont, 1940:169 (in revision of Egyptian *Tachysphex*); Honoré, 1942:56 (in checklist of

Egyptian Sphecidae); de Beaumont, 1947a:177 (in revision of Egyptian *Tachysphex*), 1950b:18 (Egypt); Balthasar, 1954:269 (Palestine); de Beaumont, 1955:181 (Morocco), 1960b:238 (Libya); Pulawski, 1971:420 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:13 (Israel); Bohart and Menke, 1976:274 (listed); Kazenas, 1978:113, 126 (in key to Sphecidae of Kazakhstan and Central Asia); Krombein and Pulawski, 1994:98 (in revision of Sri Lankan *Tachysphex*); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia).

As *Tachysphex argyrius* (♂ only): Gussakovskij, 1933:280 (Iran), corrected to *Tachysphex grandissimus* by Gussakovskij, 1952:237.

Recognition.— *Tachysphex grandissimus* has the apical depression of sternum I intersected by a longitudinal carina (as in Fig. 132a) and hindwing vein cu-a oblique (anal end further away from wing base than cubital end).

The female resembles *osiris* in having a dense thoracic vestiture: the setae entirely conceal the mesopleuron and scutal forecorner and nearly completely the sides of the propodeal dorsum. Unlike *osiris*, the labrum of *grandissimus* is emarginate (emargination evanescent in *osiris*), clypeal lip incised laterally (rather than entire), frons of the usual shape (markedly convex in *osiris*), scutal disk not hidden by vestiture (hidden in *osiris*), hindfemoral venter setose throughout (largely glabrous in *osiris*), and flagellum all black (partly red in *osiris*). Unlike *sordidus*, the clypeal bevel of *grandissimus* is at most minimally step-like (rather than clearly step-like) and the gena is practically absent in dorsal view (rather than well developed).

The male can be recognized by its shallow, dense punctures on the scutal disk and mesopleuron (practically compressed against each other) and its uniformly setose sternum II, contrasting with sterna III–V whose apical depressions are covered with appressed, long, dense (as if agglutinated) setae (Figs. 171c-e). In addition, the setae are silvery on the frons. *Tachysphex sordidus* is similar, but has the punctures separated by small interspaces on the scutal disk (mostly less than one diameter apart) and at mesopleuron center (about one diameter apart), and frontal setae mostly golden (silvery in small specimens).

Description.— Gena unusually narrow in dorsal view. Scutal and mesopleural punctures almost compressed against each other, with inconspicuous interspaces (a few scutal punctures about one diameter apart in female); punctures of mesothoracic venter about one diameter apart in female, several diameters apart mesally in male. Propodeal dorsum finely, irregularly reticulate, intersecting posterior face at about right angle; propodeal side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end further away from wing base than cubital end). Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Sternum I with apical depression bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae appressed on scape, interocellar area, postocellar area, scutum, and midfemoral venter; suberect on each side of oral fossa next to occipital carina (setal length 0.4 × basal mandibular width); on forecoxa appressed in female, suberect in male; sinuous, oriented posterad on propodeal dorsum except oriented anterad basomedially; fully concealing integument of female mesopleuron and scutal forecorner.

Head and thorax black (clypeus and part of thorax red in some females). Frontal setae silvery in both sexes. Wing membrane hyaline; costal vein of forewing yellow brown, subcostal vein brown Coloration of gaster and legs: see below. Terga I–IV (I–III in some males) silvery fasciate apically.

♀.— Labrum with well-defined notch. Clypeus: bevel convex, markedly shorter than basomedian area; lip free margin arcuate, entire or emarginate mesally, incised laterally. Width of postocel-

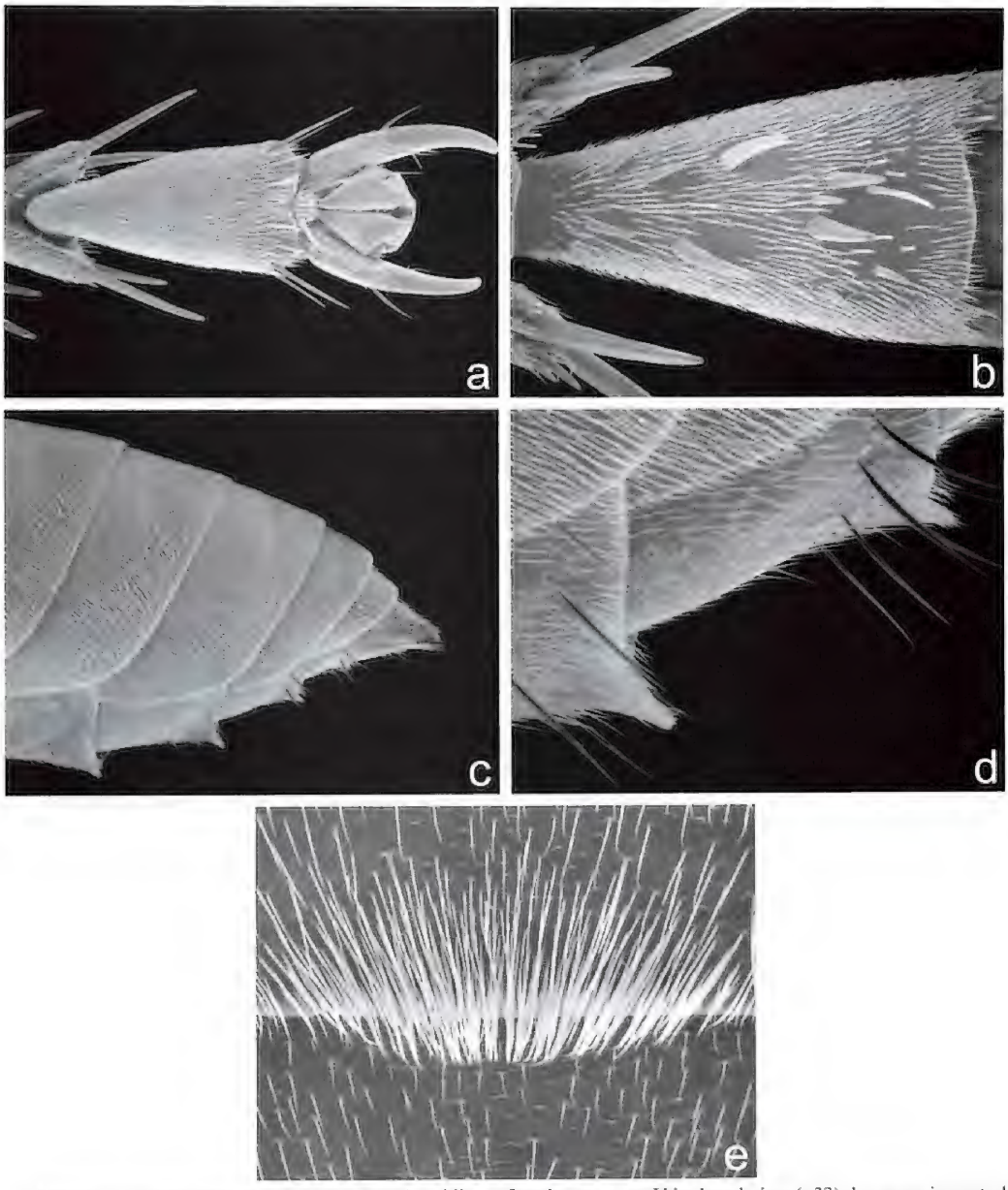

FIGURE 171. *Tachysphex grandissimus* Gussakovskij: a – female tarsomere V in dorsal view (×33); b – same in ventral view (×65); c – apical portion of male gaster in lateral view (×31); d – setal fringes of male sternum IV and V in ventral oblique view (×120); e – setal fringe of male sternum IV, ventral view (×120).

lar area 0.7 × length. Dorsal length of flagellomere I 2.5–2.8 × apical width. Dorsal foretibial surface with three spines; outer surface with three spines. Forebasitarsus with nine or ten rake spines. Apical tarsomeres long, without spines on lateral margins (Figs. 171a, b), with two preapical spines on venter (Fig. 171b). Apical depression of tergum V impunctate, glabrous. Pygidial plate: punctures averaging several diameters apart, interspaces practically unsculptured, lateral carina convex

basally and concave distally, effaced near apex. Length 14.5–18.0 mm. Gastral segments I–II or I–III red, remaining black. Femora, tibiae, and tarsi red.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel rudimentary; free margin of lobe arcuate or slightly sinuate, with well-defined corner; distance between corners 1.5–1.6 × distance between corner and orbit. Width of postocellar area 0.3–0.7 × length. Dorsal length of flagellomere I 2.0–2.5 × apical width. Forefemoral notch extending far onto femoral anterior surface, with unsculptured area that is larger than midocellar diameter; its bottom compressed into obtuse, longitudinal carina; notch base, in some specimens, with a few erect setae. Outer margin of forebasitarsus with 2–6 rake spines; outer apical spine of tarsomere II as long as tarsomere III or shorter. Sternum II: setae as long on apical depression as on remaining surface; apical depressions of sterna III–V covered with appressed, dense setae that appear agglutinated and that are markedly longer than on remaining surface (Figs. 171c–e). Length 11.0–13.5 mm. Volsella and penis valve as in *costae* (Fig. 102). Gaster black in African and Arabian specimens, and segments I and II red in those from other Asian countries. Femora all black or red apically, hindfemur all red in some specimens; tibiae and tarsi red or slightly darkened.

Geographic distribution (Fig. 172).— Sahara from Morocco to Egypt in the north and from Mali to Chad in the south, also Israel, Arabian Peninsula, Turkmenistan, Tajikistan, Iran, Pakistan, and Gujarat State of India.

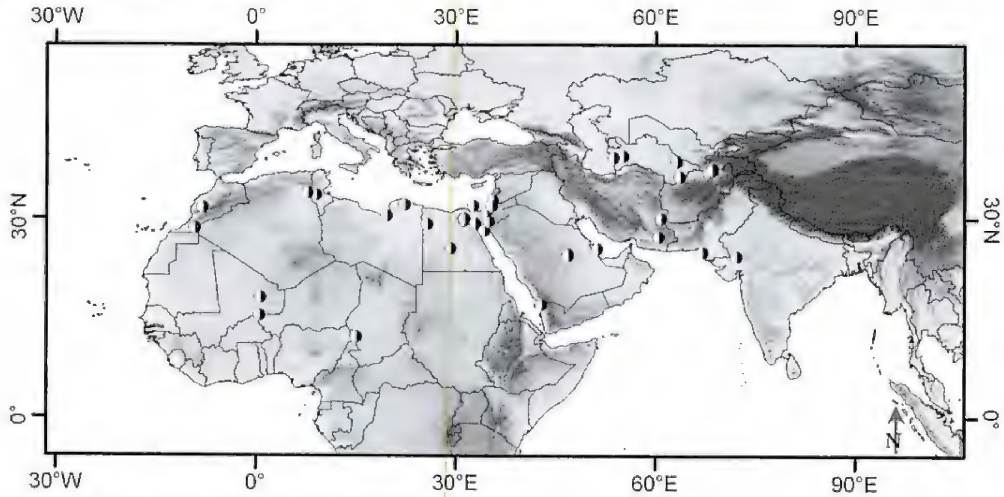

Figure 172. Collecting localities of *Tachysphex grandissimus*.

Records.— **CHAD**: N'Djamena (1 ♀, ZMAN). **EGYPT**: **Al Bahr al Ahmar**: Al Quseir (2 ♀, 1 ♂; 2 ♀, CSE; 1 ♀, 7 ♂, STUTTGART). **Al Fayyum**: Karanis (1 ♂), Kom Osheim (1 ♂). **Al Jizah** (= Ghiza): Abu Rawash (1 ♂), Dahshur (1 ♂), Ghiza (1 ♂). **Al Qahirah** (= Cairo): Wadi Digla (1 ♂), Wadi el Tih (1 ♂), Wadi Hof (1 ♂). **Al-Wadi al-Jadid**: Dakhla oasis (de Beaumont, 1940); Siwa oasis: Lake Shiata (de Beaumont, 1950b). **Sina** (= Sinai): Romani (de Beaumont, 1940), Wadi Gharandal 30 km NW Abu Zenima (2 ♂, MSNT), Wadi Khreza 40 km N Sharm el Sheikh (1 ♂). **INDIA**: **Gujarat**: Deesa (1 ♂). **IRAN**: **Baluchestan va Sistan**: Bampur-Kaskin (Gussakovskij, 1933), Hurmuk (Pulawski, 1971). **ISRAEL**: Elat (Pulawski, 1971), Masada (Pulawski, 1971), Revivim 20 km SW Beersheba (1 ♂), Wadi el Kelt near Jericho (Balthasar, 1954). **LIBYA** (de Beaumont, 1960b): **Cyrenaica**: Baltet er Ramla, Brega. **MALI**: Anefis (1 ♀, KMG), 30 km S Ansongo (1 ♂, KMG). **MOROCCO**: Dar Bou Naila (Pulawski, 1971), Maader Telmaout (Pulawski, 1971), Marrakech (2 ♂). **PAKISTAN**: Karachi (1 ♂, BMNH). **QATAR**: Al Shahanieh (2 ♂, KMG). **SAUDI ARABIA**: Abu Arish (1 ♂, KMG), El Riyadh (1 ♂), Wadi Nissah: Shaib Luha near Al Ha'ir

(1 ♂, FSCA). **TAJIKISTAN** (Pulawski, 1971, or as indicated): Ajigarm, Ayvaj in mouth of Kafirnigan River (1 ♀, 2 ♂), Djilikul, Nizhniy Pyandj, Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TUNISIA**: Jemna (1 ♂, SCHL), 15 km W Nefta at 33°50′N 7°43′E (1 ♀, CSE). **TURKMENISTAN** (Pulawski, 1971): Akhcha-Kuyma near Nebit-Dagh, Merghen-Ulya in Kopet-Dagh, Repetek, Sary-Chop 180 km S Mary, Uzun-Ada on E shore of Krasnovodsk Golf.

Tachysphex gujaraticus Nurse

Figures 173, 174.

Tachysphex gujaraticus Nurse, 1909:516, ♀, ♂. Lectotype: ♀, India: Gujarat: Deesa (BMNH), designated by Pulawski, 1975:310, examined in 1974.— Bohart and Menke, 1976:274 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia).

As *Tachysphex* No. 18 (part, other specimens = *Tachysphex erythrophorus*): de Beaumont, 1940:178 (in revision of Egyptian *Tachysphex*), corrected to *Tachysphex laniger* by Pulawski, 1971:129.

Tachysphex laniger Pulawski, 1964:105, ♀, ♂. Holotype: ♀, Egypt: Abu Rawash NW Cairo (CAS), examined. Synonymized with *Tachysphex gujaraticus* by Pulawski, 1975:310.— Pulawski, 1971:129 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:8 (Israel); Kazenas, 1978:123, 129 (in key to Sphecidae of Kazakhstan and Central Asia), 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia).

Recognition.— *Tachysphex gujaraticus* has the setae sinuous on the gena, scutum anteriorly, mesopleuron, and propodeal dorsum (largely concealing the integument of the mesopleuron and scutum anteriorly, oriented posterad on the propodeal dorsum). In addition, the labrum is flat, the cubital and anal ends of hindwing vein cu-a are equidistant from the wing base, and in the male the postocellar area is wide (width 1.4–1.7 × length), the clypeal lip is broad (corners closer to the respective orbit than to each other), and the sterna are densely, evenly setose (setae appressed).

The female of *gujaraticus* can be recognized, in addition to the above features, by a denticulate clypeal margin, with a pair of admedian teeth bordering the median emargination (Fig. 173a), and the red legs (all or largely so) help in recognition. *Tachysphex gagates* is similar, but in *gujaraticus* the propodeum is dull (dorsum rugose or partly ridged, side ridged in most specimens), and the width of postocellar area is 1.0–1.3 × length. In *gagates*, the propodeal dorsum and side are shiny, largely unsculptured, and the width of postocellar area equals 0.7–0.8 of length. Also the ranges of the two species are exclusive: *gujaraticus* occurs in northern Africa south to Nigeria and Sudan (also in Asia), whereas *gagates* is found in southern Africa north to Kenya.

The male of *gujaraticus* resembles *erythrophorus*, but has the usual mesothoracic venter (the anterior portion is shorter than the posterior part), the dorsal length of its flagellomere I is 1.0–1.4 × apical width, the ventral length in most specimens approximates the apical width, and the forefemoral notch of some specimens is acutely angulate basally. In *erythrophorus*, the mesothoracic venter is unusual, with the anterior (oblique) portion longer than the posterior (horizontal) part (Fig. 130), the dorsal length of flagellomere I is 1.5–2.2 × apical width, the ventral length conspicuously more than the apical width, and the forefemoral notch is obtusely angulate basally.

Description.— Scutal punctures about one diameter apart except discal punctures two to many diameters apart in most females and some males. Mesopleuron dull, granulose. Propodeum dull; dorsum irregularly rugose, partly ridged in some specimens; side ridged or ridges evanescent. Hindcoxal dorsum with inner margin not carinate.

Setae (numbers in parentheses refer to setal length expressed as a fraction of basal mandibular width): appressed on postocellar area, erect on each side of oral fossa next to occipital carina (0.4–0.5); sinuous or curved on gena, scutum anteriorly (0.5–0.6), and mesopleuron, sinuous on propodeum (except straight on propodeal side anteriorly); on scutal disk curved (semicircular), with

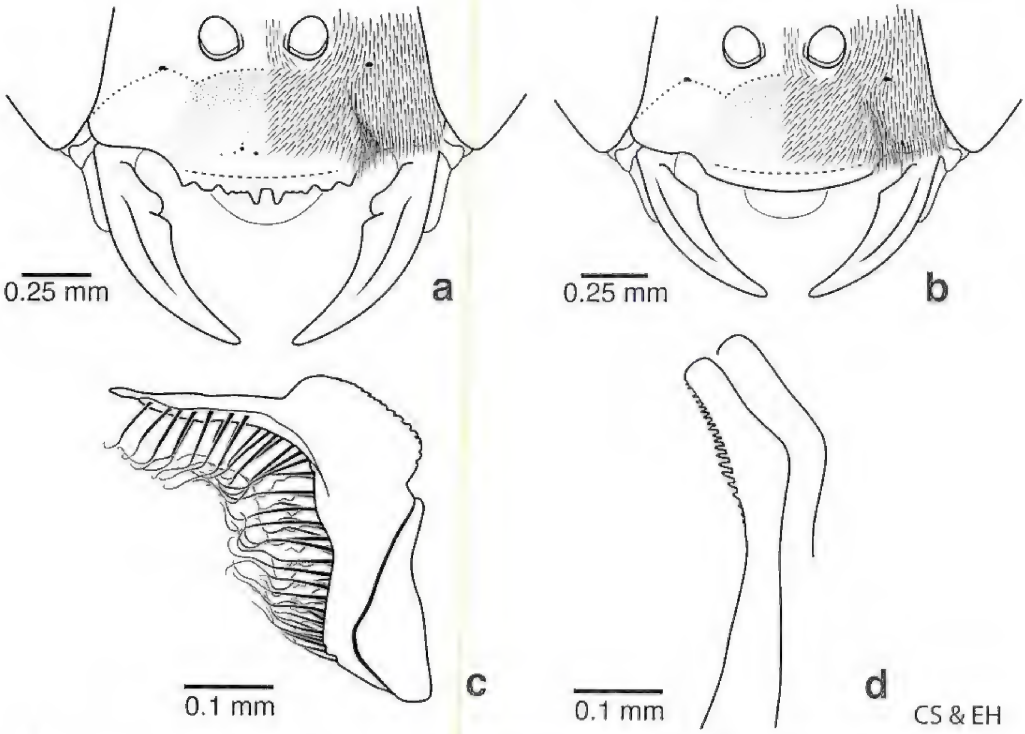

FIGURE 173. *Tachysphex gujaraticus* Nurse: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

tips nearly reaching scutal surface; oriented posterad on propodeal dorsum (0.4–0.6); appressed on midfemoral venter.

Head largely black, but the following are reddish yellow: mandible (except apical third), clypeal bevel and lip (lip black in many males), and scapal venter (black in many specimens). Frontal setae silvery in both sexes. Wing membrane hyaline: forewing costal vein reddish brown, subcostal vein brown. Color of legs and gaster: see below. Terga I–IV silvery fasciate apically (I–V in specimens from West Africa).

♀.— Clypeus (Fig. 173a): bevel shorter than basomedian carina; lip free margin arcuate, with a pair of admedian teeth and three pairs of lateral teeth; lateral teeth irregularly shaped in many specimens, confluent in some. Width of postocellar area 1.0–1.3 × length. Dorsal length of flagellomere I 1.4–2.2 × apical width. Dorsal foretibial surface with two spines; outer surface with one to three spines, with punctures sparser than on remaining surface. Forebasitarsus with eight or nine rake spines. Pygidial plate smooth, shiny, with fine, scattered punctures. Length 6.5–9.0 mm. Thorax black, but pronotal lobe yellow apically and mesothoracic venter reddish between midcoxae. Legs red except fore- and midcoxae black in some specimens and forefemur largely black in Sri Lankan females. Gaster red or partly black (see Geographic Variation below).

♂.— Mandible: trimmal carina with small tooth and cleft. Clypeus (Fig. 173b): bevel shorter than basomedian area; lip free margin arcuate, with obtuse, somewhat ill-defined corner; distance between corners 1.4–1.6 × distance between corner and adjacent orbit. Width of postocellar area 1.4–1.7 × length. Dorsal length of flagellomere I 1.0–1.4 × apical width. Forefemoral notch asetose. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of tarsomere II

longer than tarsomere III. Length 4.8–7.0 mm. Volsella and penis valve: Figs. 173c, d. Thorax black, pronotal lobe black or (most specimens) yellow apically. Femora, tibiae, and tarsi red or femora black (hindfemur less frequently so than fore- and midfemora); tibiae partly black in specimens from Tajikistan. Gaster red with brown apical segments or all dark brown (with apical depressions of segments translucent).

CORRECTION TO EARLIER DESCRIPTION.— Pulawski (1971:131 and Fig. 60) incorrectly described the male clypeus as having the lip rounded laterally. A reexamination of voucher specimens from Egypt using better optics revealed that the lip is obtusely angulate laterally.

GEOGRAPHIC VARIATION.— In most males, the forefemoral notch has a flat bottom, and its proximal margin is not prominent. The bottom is somewhat compressed to an obtuse, longitudinal crest in males from Egypt; and the proximal margin is sharply prominent in males from Egypt and Senegal.

The gaster is all red in females from Egypt, Israel, Saudi Arabia, Turkmenistan, and Tajikistan, but terga II and III or II–IV are largely black in those from Sri Lanka.

GEOGRAPHIC DISTRIBUTION (Fig. 174).— North Africa south to Mali, Nigeria and Sudan, also Israel, Arabian Peninsula, Tajikistan and Turkmenistan, India, and Sri Lanka.

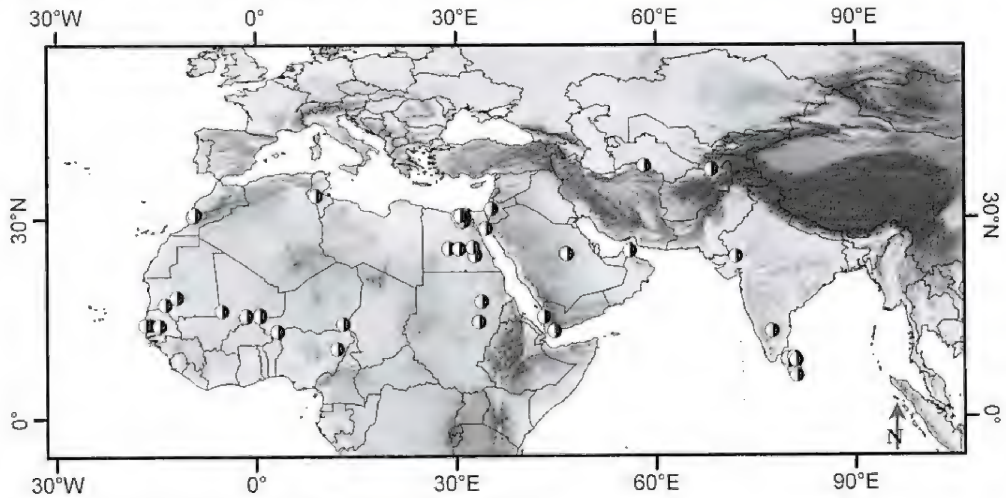

FIGURE 174. Collecting localities of *Tachysphex gujaraticus*.

RECORDS.— **EGYPT**: **Al Buhayrah**: Bir Hooker in Wadi Natrun (1 ♂), Sahara Inn Hotel 117 km SE Alexandria (1 ♀, FSCA). **Al Fayyum**: Karanis (7 ♂; 2 ♂, MSNT), Kom Osheim (1 ♀, 9 ♂). **Al Jizah** (= Ghiza): Abu Rawash (1 ♀ holotype of *laniger*, 5 ♂), Ghiza (3 ♂), Manshiet Radwan (Pulawski, 1971). **Al Qahirah** (= Cairo): Maadi (1 ♂). **Al-Qalyubiyah**: Abu Zab'al at 30°15′N 31°21′E (Pulawski, 1971). **Al-Uqsur** (= Luxor): near Medinet Habu temple 3 km W Luxor (1 ♂). **Al-Wadi al-Jadid**: Dakhla oasis: Mut (1 ♀, ZMAN), Kharga oasis (3 ♀). **Aswan**: Kom Ombo (3 ♀, 5 ♂). **Sina** (= Sinai): Dahab (Roche and Zalat, 1994). **INDIA**: **Gujarat**: Deesa (1 ♀ lectotype of *gujaraticus*, 2 ♂, BMNH). **Karnataka**: Bangalore (1 ♀, 1 ♂). **ISRAEL**: En Gedi (Pulawski, 1971), Revivim (1 ♂). **MALI**: central Adrar (1 ♂, KMG), Ansongo (1 ♀, 1 ♂, BMNH), 30 km S Ansongo (1 ♂, KMG), 10 km E and 30 km NE Hombori (2 ♂, MS). **MAURITANIA**: 25 km NE Aleg (1 ♀, MSNT), Oued Henné ca 50 air km NE Moudjéria (1 ♀; 1 ♀, MSNT). **MOROCCO**: Taroudannt: Oued Souss (1 ♀, BMNH), Tassademt (1 ♀). **NIGER**: **Diffa Region**: 13 km SW Nguigmi at 14°10.3′N 13°01.3′E (1 ♀). **Dosso Region**: Dosso (1 ♀, KMG). **NIGERIA**: Azare in SE Kano (1 ♀, BMNH). **SAUDI ARABIA**: Ad Diriyah (1 ♂, KMG), El Riyadh (Pulawski, 1971). **SENEGAL**: Kaolack (1 ♀, MSNT), near Koumpentoum (1 ♂, UCD), Ndangane 45 air km SE Mbour (1 ♂; 4 ♂ FB). **SRI LANKA**: **Hambantota**

District: Bundala Sanctuary (1 ♂, USNM). **Mannar District**: Kokmotte Bungalow 0.5 mi NE Wilpattu National Park (2 ♂, USNM), Ma Villu (3 ♀; 8 ♀, 1 ♂, USNM); Ma Villu: Kondachchi (1 ♂; 2 ♂, USNM). **Trincomalee District**: Amarivayal (1 ♀, USNM), China Bay Ridge Bungalow (1 ♀; 11 ♀, 1 ♂, USNM), Tennamaravadi (1 ♂, USNM). **SUDAN**: Ed Damer: Hudeiba (1 ♀, ZSBS), Narga 150 km SE Khartum (1 ♀, CSE). **TAJIKISTAN** (Pulawski, 1971): Ajigarm, Djilikul, also Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TUNISIA**: 5 km W Douz at 33°29′N 8°59′E (1 ♀, CSE). **TURKMENISTAN**: Askhabad (Pulawski, 1971). **UNITED ARAB EMIRATES**: Fagsha (1 ♂, KMG). **YEMEN**: Al Kadan (1 ♀, ZMAN), Lahj (1 ♀, ZMAN).

Tachysphex hadronyx Pulawski, sp. nov.

Figures 175–177.

Derivation of name.— *Hadronyx* is derived from two Greek words: *hadros*, thick, bulky, stout; and *onyx*, fingernail, claw; a noun in apposition to the generic name. With reference to the unusually thick female claws.

Recognition.— *Tachysphex hadronyx* has the labrum convex and protruding beyond the clypeal free margin and the galea about as long as the scape. Unlike most other species with these characteristics, *hadronyx* has sinuous, erect setae on both postocellar area (as in *fulgidus* and *tenuicornis*) and basal declivity of tergum I (as in *fulgidus* and *gastrotrichus*), although only laterally so on tergum I in some males. Unlike these three species, *hadronyx* has an unusually broad postocellar area whose width markedly exceeds length. Additional recognition features include: gastral base red, mandibular notch unusually small (as in Figs. 385c, d); forecoxa with apical process except in small males (Fig. 175c); hindfemoral venter all asetose or with a few setae basally; propodeal side uniformly ridged (ridges evanescent in many males); and in the female: antenna unusually long (e.g., length of flagellomere I 4.2 × apical width), inner mandibular margin with largely reduced tooth (Fig. 175a).

Two female characters are unique within the genus: hindfemur and claws conspicuously thickened (Figs. 175d, f), and a grotesque, conspicuously thickened and curved seta under each claw (Fig. 175f).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea with punctures about one diameter apart posteriorly and several diameters apart anteriorly (interspaces aciculate to practically unsculptured), as long as 0.9 × scape in female, 1.0 × in male. Postocellar area concave except in smallest males. Scutal punctures, on disk, varying from about one to several diameters apart. Mesopleural punctures well defined to ill defined, about 1–2 diameters apart anteriorly and several diameters apart posteriorly; interspaces aciculate and dull to unsculptured and shiny. Punctures of mesothoracic venter varying from less than one diameter apart to several diameters apart. Propodeal dorsum and side ridged, but ridges evanescent or absent in smallest males. Forecoxa with apical process (Fig. 175c) except in smallest males. Hindcoxal dorsum with inner margin carinate (except posteriorly).

Setae erect and sinuous on postocellar area, gena, scutum, mesopleuron, propodeal dorsum and posterior face, and basal declivity of tergum I (only laterally in smallest males). Setal length about 0.7 × basal mandibular width on postocellar area, on each side of oral fossa next to occipital carina, on scutum anteriorly, and on propodeal dorsum; up to 0.3–0.5 on tergum I. Hindfemoral venter all asetose or with a few setae basally. Sternum I asetose (except laterally).

Head and thorax black, mandible yellowish red mesally. Frontal setae silvery in female, golden in male (only slightly so in smallest specimens). Wing membrane hyaline; forewing costal and subcostal veins light brown or subcostal vein somewhat darkened. Femora black (except at very apex), tibiae and tarsi red. Gastral segments I and II or I–III red, remainder black. Terga without silvery, apical fasciae.

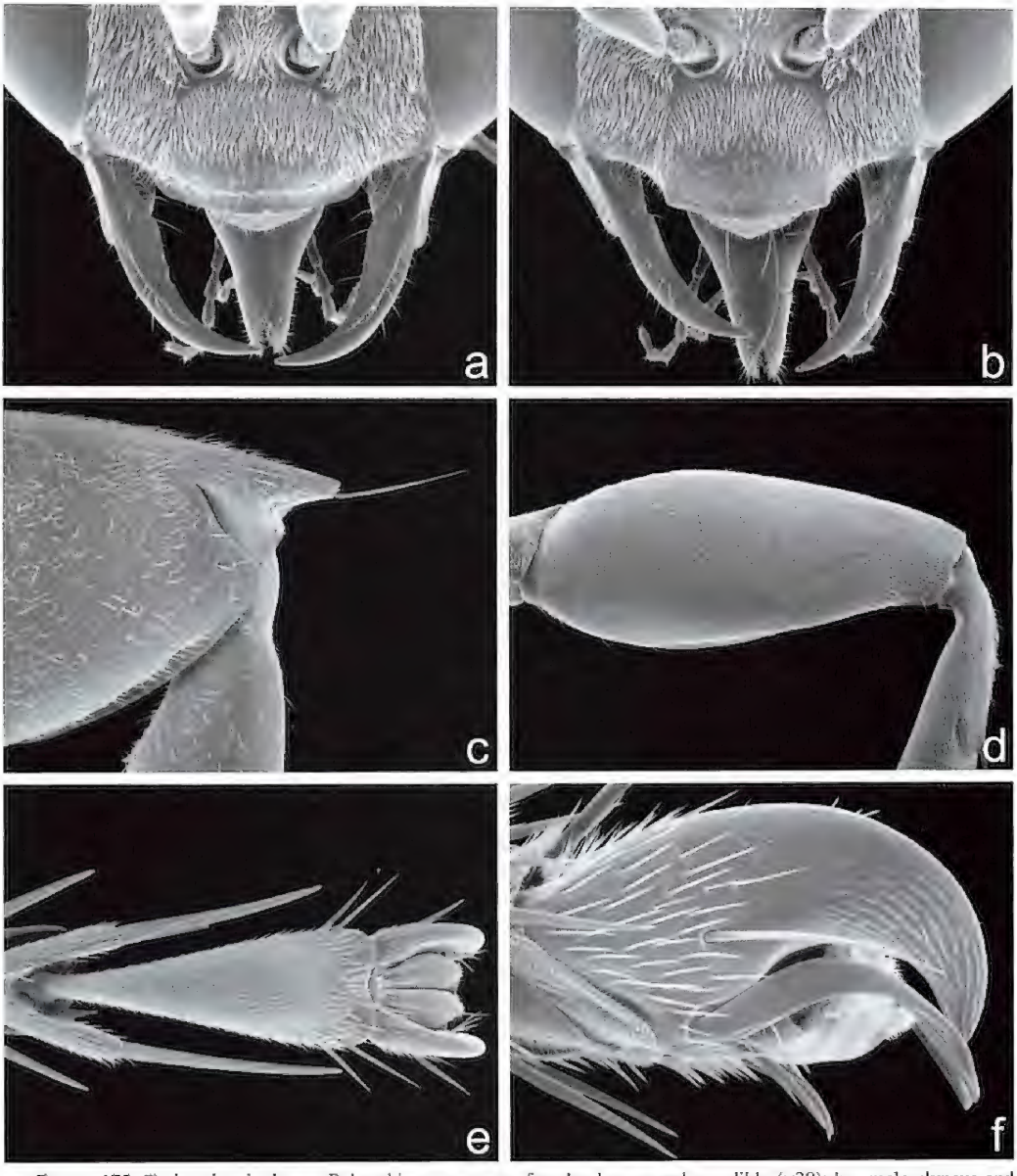

FIGURE 175. *Tachysphex hadronyx* Pulawski, sp. nov.: a – female clypeus and mandible (×30); b – male clypeus and mandible (×39); c – female forecoxa (×72); d – female hindfemur (×33); e – apical female tarsomere in dorsal view (×60); f – female claws with thickened seta beneath (×180).

♀.— Mandible: trimmal carina with largely reduced tooth (Fig. 175a). Clypeus (Fig. 175a): lobe somewhat compressed laterally, bevel slightly longer mesally than basomedian area; lip free margin arcuate, not incised laterally. Postocellar area concave, its width 1.7–1.8 × length. Dorsal length of flagellomere I 4.2 × apical width. Dorsal foretibial surface with two or three spines; outer surface impunctate, glabrous, with two spines. Forebasitarsus with 7–9 rake spines. Hindfemur

unusually thick (Fig. 175d). Apical spines of hindtarsomere IV unusually long, almost reaching claw bases (Fig. 175e). Apical tarsomeres elongate (Fig. 175e). Claws markedly thickened, with thickened, curved seta beneath (Fig. 175f). Apical depression of tergum V asetose. Pygidial plate with microsculpture that varies from conspicuous to evanescent; punctures averaging many diameters apart. Length 7.6–11.5 mm.

♂.— Mandible: trimmal carina angulate but without real tooth or cleft. Clypeus (Fig. 175b): bevel about as long as basomedian area; lip free margin slightly arcuate, corner obtuse; distance between corners 1.2 × distance between corner and orbit. Width of postocellar area 1.8–1.9 × length. Dorsal length of flagellomere I 3.0–3.2 × apical width. Forefemoral notch glabrous. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Tergum VII: punctures 1–2 to several diameters apart mesally. Sterna without subbasal, setal fringes, punctures of sterna II–V up to several diameters apart mesally. Length 5.5–8.5 mm. Volsella and penis valve: Fig. 176; apex of gonoforceps curved toward midline (as in Fig. 386d).

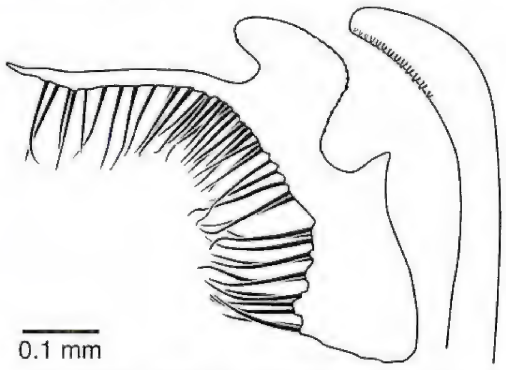

FIGURE 176. *Tachysphex hadronyx* Pulawski, sp. nov.: volsella and penis valve.

FLORAL RECORDS.— Specimens from Agate Beach, Namibia, were collected on flowers of *Zygophyllum clavatum* Schltr. and Diels, and those from Aus to Rosh Pinah on flowers of *Galenia* sp. (Aizoaceae), as recorded by F.W. and S.K. Gess, the collectors.

GEOGRAPHIC DISTRIBUTION (Fig. 177).— Namibia (Namib Desert only) and South Africa (Namaqualand and Little Karoo).

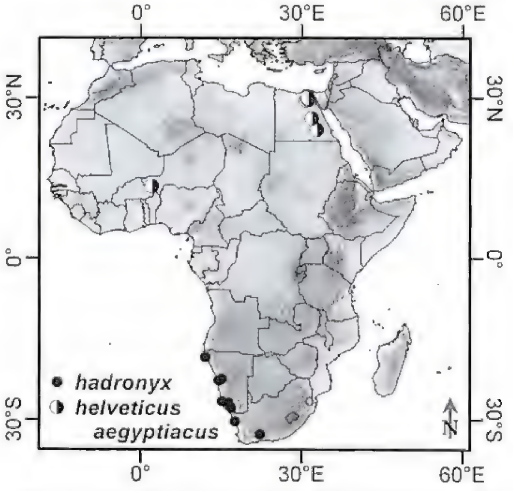

FIGURE 177. Collecting localities of *Tachysphex hadronyx* and *helveticus aegyptiacus*.

RECORDS.— HOLOTYPE: ♀, **NAMIBIA: Swakopmund District**: 63 km NE Swakopmund at 22°24′S 15°02′E, 9 Dec 1996, WJP (CAS). PARATYPES: **NAMIBIA: Lüderitz District**: Lüderitz: Agate Beach, 29 Feb 2000, FSG (1 ♀, 1 ♂, AMG), same data but 15°11′E (1 ♂); Aus to Rosh Pinah at 26°50.07′S 16°17.65′E, 11 Sept 2003, FSG (1 ♀, 2 ♂; 3 ♀, 20 ♂, AMG); Namuskluft 88 [Farm], 7–15 Oct 1970, collector unknown (1 ♀, NMN). **Opuwo District**: Carlowa's Camp, Angra Fria, 14–16 Nov 1970, collector unknown (1 ♂, NMN). **Swakopmund District**: Swakopmund, 26–30 Jan 1972, BMNH Southern Africa Expedition (1 ♀, 3 ♂, BMNH); Swakopmund, 12 Feb 1993, J. Gusenleitner (1 ♂, JG), MS (1 ♂; 1 ♀, 1 ♂, MS); 15 km E Swakopmund, 8 Feb 1993, MS (1 ♂, MS); 63 km NE Swakopmund, WJP, 15 Feb 1996 (1 ♀, 6 ♂), 19 Feb 1996 (1 ♀, 5 ♂), 5 Mar 1996 (5 ♂), 5 Dec 1996 (7 ♂), 9 Dec 1996 (1 ♀, 14 ♂); Swakop River at bridge near mouth, 12 Apr 1998, FSG (1 ♂, AMG). **SOUTH AFRICA: Northern Cape Province**: Wallekraal in Namaqualand at 30°24′S 17°31′E, Oct 1950, [South African] Museum Expedition (1 ♀, SAM). **Western Cape Province**: Lammerskraal in Prince Albert District, Sept 1947, [South African] Museum Expedition (1 ♀, SAM).

***Tachysphex harpax* Arnold**
Figures 170, 178–180.

Tachysphex harpax Arnold, 1923a:161, ♀. Holotype: ♀, Zimbabwe: Sawmills (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:274 (listed).

Tachysphex unguiculatus Arnold, 1924:63, ♀, ♂. Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (TMP), **here designated**, examined. **New synonym.**— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed).

Tachysphex verhoeffi Pulawski, 1971:220, ♀, ♂. Holotype: ♀, Israel: Bat Yam (RMNH), examined before 1971. **New synonym.**— de Beaumont, Bytinski-Salz, and Pulawski, 1973:9 (Israel); Bohart and Menke, 1976:277 (listed).

LECTOTYPE SELECTION.— Of the two specimens designated as types of *unguiculatus* by G. Arnold, I have selected the female as the lectotype and the male as the paralectotype.

RECOGNITION.— The female of *harpax* has conspicuously modified tarsi: tarsomeres III are short (e.g., length of midtarsomere III 1.2–1.4 × apical width), the dorsoapical emargination of mid- and hindtarsomeres IV is rounded proximally rather than angulate, and tarsomeres V have the apicoventral margin produced into a lobe and, in the vast majority of specimens, 1–3 spines near midlength of each lateral margin (Figs. 179a-c). In the vast majority of specimens, the apical tarsomeres and claws are elongate, the length of arolium being equal to about one third of a claw (Figs. 179b, c). In addition, the labrum free margin has a row of short, thickened setae (Fig. 178c). The females of *rapax* and *scopa* are similar, but unlike these species the scutal and femoral setae of *harpax* are all straight and appressed (rather than sinuous and erect).

The male of *harpax* is difficult to recognize because of considerable variation and lack of apparent diagnostic characters. The most distinctive, although somewhat difficult to see, are short, thickened setae at the free margin of the labrum (Fig. 178c). These setae are similar in *aburi*, *mzingeli*, *rapax*, and *scopa*. *Tachysphex harpax* and *aburi* differ only minimally: in *harpax* the venter of each apical tarsomere has a group of small, preapical spines (Fig. 179d), only two in some specimens, but only one or two such spines in *aburi*. Unlike *rapax* and *scopa*, the cephalic and thoracic setae of *harpax* are straight and appressed rather than erect and sinuous, the propodeal dorsum is evenly microareolate, rugose or longitudinally ridged (transversely ridged posteriorly in some *rapax*), and sternal setae are not unusually developed (sterna II–VI, in *scopa*, have unusually dense, suberect setae). Unlike *mzingeli* (in which the thoracic setae are strikingly golden and the wings yellow in basal half), the setae of *harpax* are all silvery on the thorax, and the wings are slightly to conspicuously infumate but not yellow. Subsidiary recognition features of *harpax* include: penultimate tarsomeres about as long as wide, galea at least slightly longer than wide in profile; and clypeal lobe narrow in most specimens (clypeal midline 1.2 × distance between lip corners). The clypeal midlength is equal to the distance that separates the lip corners in a specimen from Redbank, Zimbabwe; like other males from Redbank and many males from other localities, the specimen has a conspicuously tridentate sternum VIII (Fig. 180b).

SPECIES DELINEATION.— The specimens that I attribute to *harpax* can be recognized by the distinctive labral setae and female tarsi in combination with the appressed thoracic setae, yet populations from various areas differ considerably in sculpture, pilosity, female tarsal spines, shape of male sternum VIII, and coloration. There seems to be almost as many permutations of these characters as there are collecting localities, suggesting geographic or local variation rather than a series of discrete species.

JUSTIFICATION OF NEW SYNONYMY.— The type specimens of *harpax*, *unguiculatus*, and *verhoeffi* are clearly conspecific. These names are therefore synonyms.

DESCRIPTION.— Galea at least slightly longer than wide in profile, as long as 0.7–0.8 of scape

in most specimens, as 1.1 of scape in single male from Namutoni area, Namibia. Setae emerging from labrum free margin unusually short and stout (Fig. 178c). Scutal punctures well defined, about one diameter apart. Episternal sulcus complete in one of the females from Cape of Good Hope Nature Reserve. Mesopleural punctures varying from well defined to inconspicuous. Propodeal dorsum and side varying from evenly microareolate to markedly ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I, in some males, with inconspicuous, obtuse carina bisecting apical depression.

Setae sparse to dense and straight or sinuous on each side of oral fossa next to occipital carina, about as long as one midocellar diameter; appressed on postocellar area and scutum; on propodeal dorsum varying, straight or partly sinuous, oriented either posterad or anterolaterad.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, silvery or golden in male. Wing membrane nearly hyaline; forewing costal vein light brown, subcostal vein brown. Femora all black, red at least apically in specimens with red tibiae; mid- and hindfemora all red in single male from Taita Discovery Centre, Kenya, and all femora red in single female from Nigeria and one female and several males from Emanguzi, South Africa. Tibiae, tarsi, and gaster varying from all black to all red. The female from Nigeria is unusual in having the frontal and thoracic setae all golden, as well as gastral fasciae. Terga I–III silvery fasciate apically, also tergum IV fasciate laterally in specimens from Redbank and Victoria Falls, Zimbabwe, a female from Magadi road, Kenya, and in single female from Mooketsi, South Africa.

♀.— Labrum arcuate or slightly, shallowly emarginate mesally. Clypeus (Fig. 178a): bevel

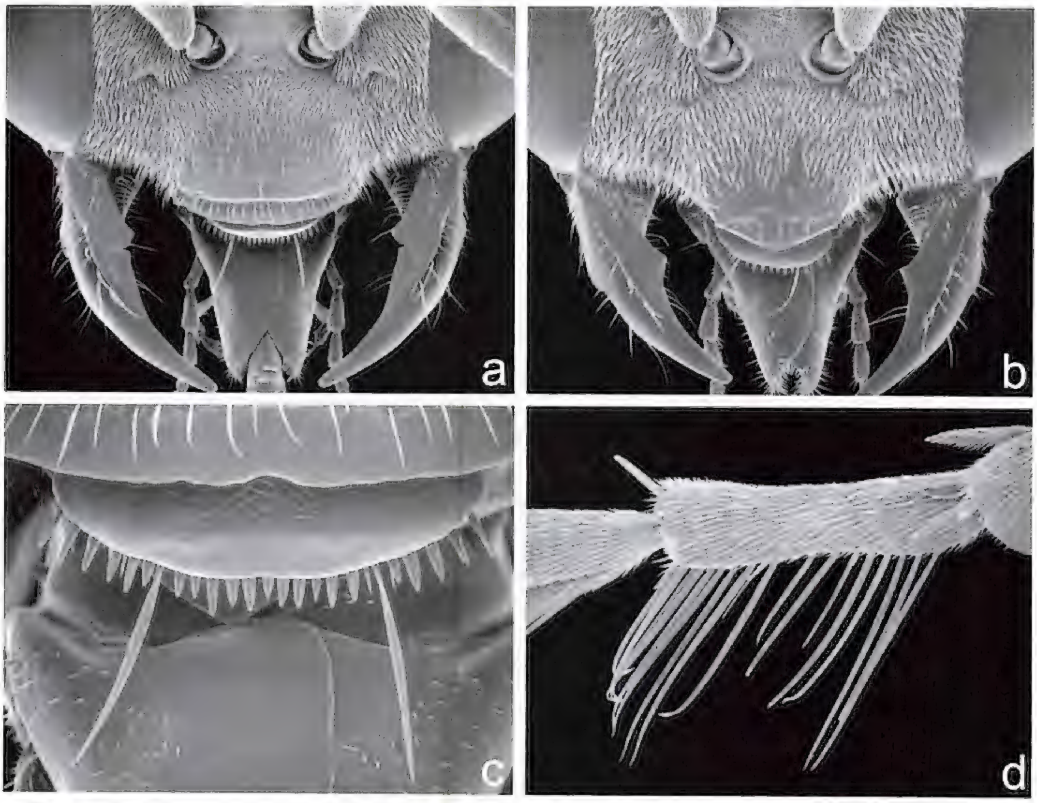

FIGURE 178. *Tachysphex harpax* Arnold: a – female clypeus and mandible (×34); b – male clypeus and mandible (×36); c – female labrum seen obliquely from below (×120); d – female forebasitarsus (×72).

about as long as basomedian area; lip free margin arcuate, incised or not incised laterally. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Dorsal foretibial surface with at most one spine that is located near apex; outer surface with a few fine bristles. Forebasitarsus with 11–18 rake spines (Fig. 178d). Length of fore-, mid-, and hindtarsomeres III 1.2–1.3, 1.2, and 1.0–1.4 × apical width, respectively. Tarsomeres IV: length equal to apical width, dorsoapical emargination rounded proximally (Fig. 179a). Venter of apical tarsomeres with row of erect setae along each lateral margin and with 1–3 spines about midlength of each lateral margin (Figs. 179a, b), but spines lacking in single female from Kirkwood, South Africa; also with up to several spines on each lateral margin basally in some specimens; apicoventral margin produced into lobe (Fig. 179c). Outer claws of mid- and hindtarsi minimally thinner than inner claws (opposite on foretarsus). Apical depression of tergum V unsculptured and asetose, at least partly. Pygidial plate slightly emarginate apically (not emarginate in single female from Nigeria), its punctures widely spaced to nearly contiguous. Length 7.1–9.1 mm (9.8–11.0 mm in those from Iringa and Morogoro Regions, Tanzania).

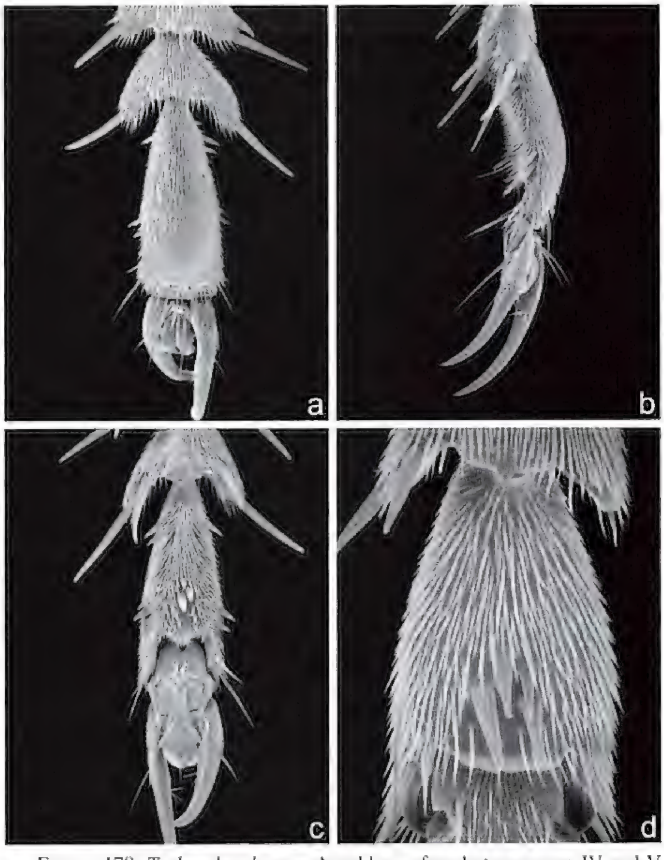

FIGURE 179. *Tachysphex harpax* Arnold: a – female tarsomeres IV and V dorsally (×72); b – female hindtarsomere V laterally (×60); c – female hindtarsomere V in ventral view (×60); d – apical tarsomere of male in ventral view (×240).

♂.— Mandible: trimmal carina with tooth, cleft present or absent. Clypeus (Fig. 178b): bevel mostly shorter than basomedian area but about as long as basomedian area in specimens from Redbank, Zimbabwe, and ill defined or absent in those from Kenya and Tanzania; lip free margin arcuate (shallowly emarginate mesally in specimens from Middle East), but shallowly concave between midpoint and corner in some Kenyan and southern African specimens; lip corner well defined but not prominent; distance between corners 0.9–1.0 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.3–1.5 × apical width. Forefemoral notch microscopically setose, setae either easily visible or evanescent. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Tarsomeres IV about as long as wide. Apical tarsomeres each with a group of at least two subapical spines on venter (Fig. 179d); some 8–10 small ventral spines present in one of the two males from Bat Yam, Israel; also with spines on lateral margin in specimens from Morogoro

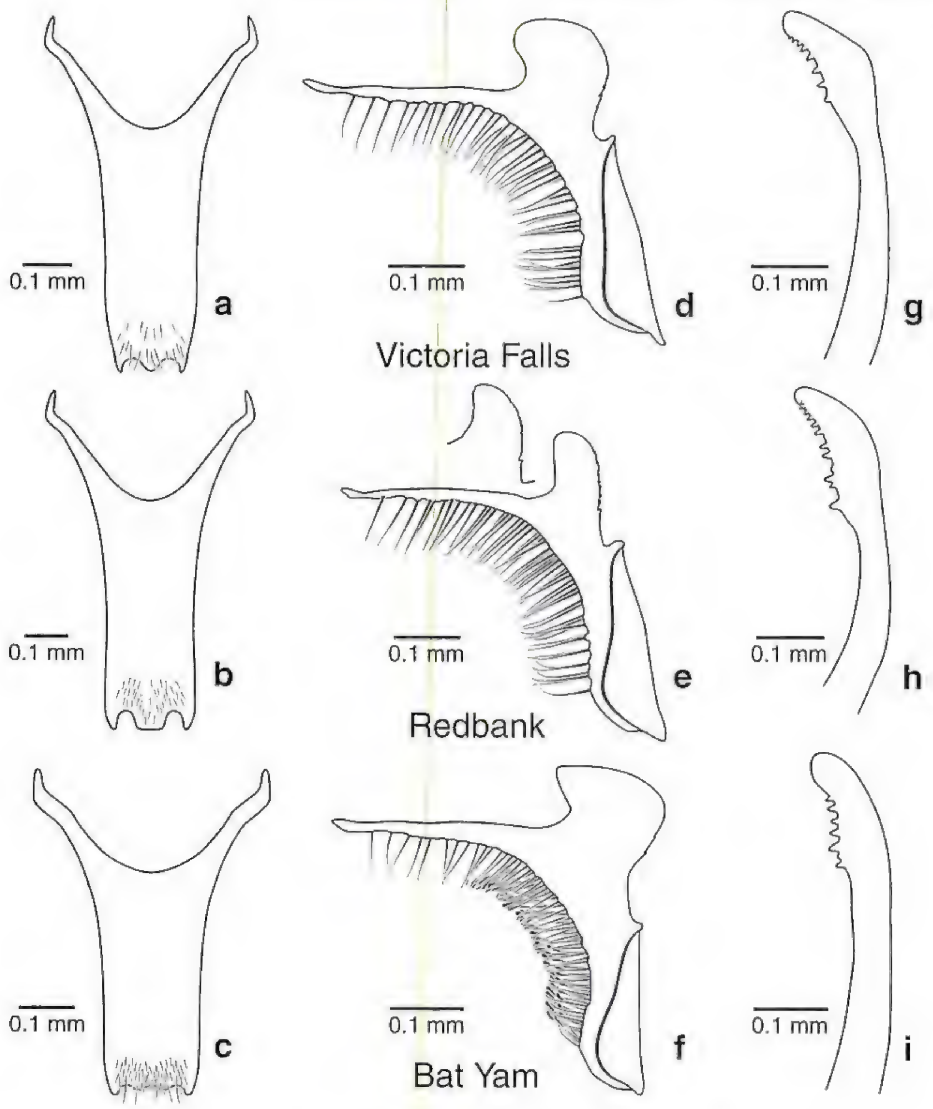

FIGURE 180. *Tachysphex harpax* Arnold: a-c – male sternum VIII; d-f – volsella; g-i – penis valve.

area, Tanzania. Sternum VIII: apical margin with median projection that varies from conspicuous to rudimentary (Figs. 180a-c). Length 5.0–7.5 mm (9.7 mm in those from Morogoro area, Tanzania). Volsella and penis valve: Figs. 180d-f and 180g-i.

VARIATION.— Supraantennal swelling. Well defined in most specimens (shape usual for the genus), but reduced in size or vestigial in some southern African specimens and a male from Mkomazi area, Tanzania, and all finely punctate in a female from Arusha, Tanzania, and in both Tanzanian males.

Mesopleural punctures. Well defined in many specimens (including the female from Senegal and that from Magadi road, Kenya), but ill defined in those from Israel and Syria, Nigeria, other Kenyan specimens, female from Arusha, Tanzania, those from Zimbabwe: Bulawayo, Kami,

Nyamandhlovu area, Victoria Falls, and one female from Redbank, and ill defined or intermediate in many from South Africa.

Propodeal dorsum. Ridged or rugose in most specimens (slightly so in some), but evenly microareolate in males from Karasburg District, Namibia, Kami and Victoria Falls, Zimbabwe, and some from Bedford area, Colchester, Kirkwood, Pretoria, Tembe Elephant Park, and Willowmore, all South Africa.

Propodeal side. Ridged in most specimens (evanescent ridges present only anteriorly in many including those from Israel and Syria), unridged in many males.

Genal setae. Setae, next to oral fossa, straight in most specimens but sinuous in females from Middle East; mostly suberect but erect in single female from Angola and females from Middle East.

Propodeal setae. Mostly straight, oriented posterad on dorsum (in some specimens oriented anterad adjacent to foremargin), but in specimens from Israel and Syria sinuous between side and posterior face and oriented anterolaterad on dorsum.

Color of tibiae. Tibiae black except red in specimens from the following areas: Nigeria, Kenya: Archer's Post area, Kisima Rock, Marich Pass, Mount Kasigau, 26 mi SW Nairobi, and Taita Discovery Centre; Mkomazi area, Tanzania; Angola and Zambia; Namibia: Mariental, Karasburg and Windhoek districts, and Namutoni area; Zimbabwe: Nyamandhlovu area, Redbank (males only), and Victoria Falls; South Africa: Algoa Bay, Arkoep Farm, Bedford area, Cape of Good Hope Nature Reserve (males only), 20 km N Citrusdal (male only), Colchester, Fort Beaufort, Hilton Farm, Lambert's Bay, Langjan Nature Reserve (tibiae black in some specimens), Platriver (foretibia largely black), Sandveld Nature Reserve, Swartrivier, Tierberg Farm, Willowmore area, and Worcester.

Color of gaster. Gaster all black in most specimens (including those from Redbank, Zimbabwe, collected January 1995), but red basally (segments I and II or I–III) in specimens from Nigeria, from Gouph and Sandveld Nature Reserve, in one female and some males from Emanguzi, South Africa, those from Mariental to Keetmanshoop, Namutoni area, and 114 km N Swakopmund, Namibia, those from Bubye River and Victoria Falls, Zimbabwe, and the males from Nyamandhlovu area and Redbank, Zimbabwe (collected December 1995); the gaster is black except for a reddish basomedian spot on tergum II in single male form Taita Discovery Centre, Kenya; the following are red in the single male from Arkoep Farm, South Africa: tergum I mesally, tergum II basomedially, and most of sternum II; gaster all red in most specimens from Namibia, in single female from Angola, and single male from Mkomazi area, Tanzania; and gaster black with red apex in single females from Bulawayo and Marondera, Zimbabwe (red are segments V and VI) and from Arusha, Tanzania (also sternum V red) and in males from Magadi Road, Kenya, and Kami, Zimbabwe (red are terga VI and VII and apical sterna mesally).

Female clypeal lip. Not incised laterally in specimens from Israel; minimally incised in specimens from Angola, Namibia, most from Zimbabwe, and many from South Africa; and with two incisions on each side in specimens from Senegal, Nigeria, Kenya (incisions well defined in that from Karen), and Tanzania, some from Zimbabwe, from Mooketsi, South Africa (incisions moderately well defined), and from Zambia (inner incision minimal).

Female scutellum. In the specimens from Middle East and Kenya, the scutellum is evenly convex, with punctures about equal on the whole surface. In most specimens from Angola, Namibia, South Africa, Tanzania, Zambia, and Zimbabwe, and many from South Africa, the central portion of the scutellum is slightly concave, with punctures conspicuously smaller and denser, contrasting in size with those on the axilla (including specimens from Redbank, Zimbabwe, collected in January 1995). The punctures, however, are only slightly smaller in the holotype female of *harpax*, and all about equal (not reduced in size at the center) in single Zimbabwean females from

Bulawayo, Nyamandhlovu area, Victoria Falls, and in two females from Redbank (those collected December 1995). In many females from South Africa, the punctures of the concave central area are of two sizes: smaller and larger.

Female apical tarsomeres and claws: length. In the vast majority of specimens, the apical tarsomeres and claws are elongate, claw length being about 3.0 × that of arolium (Figs. 179b, c). The apical tarsomeres and claws are not elongate in the single specimen from Magadi road, Kenya, and those from Morogoro Region, Tanzania, the claw length being about 2.0 × that of arolium.

Female apical tarsomeres: spines. Apical tarsomeres have no basal spines in most specimens, but have subbasal spines on each lateral margin in many (e.g., South African females from Bedford area, Fort Beaufort, Mooketsi, Platriver, Swartberg River, Tierberg Farm, and Willowmore, and single females from Rundu and Windhoek districts, Namibia). The number of subbasal spines on each lateral margin varies from one to three (spines lacking in single female from Kirkwood, South Africa), and the numbers may differ on the two sides of each tarsomere. In one female from Tierberg Farm, the spines form a continuous row from base to midlength.

Female tergum V. Apical depression unsculptured and asetose in most specimens, with a few evanescent punctures in a female from Redbank, Zimbabwe, and with many punctures mesally in females from Nigeria; Kenya; Arusha, Tanzania; Bulawayo, Zimbabwe; and those from Guernsey Farm, Pretoria Botanical Garden, Skukuza, and one of several females from Bedford area, all South Africa. The number of mesal punctures varies from a few to many in the females from Tierberg Farm.

Female pygidial plate. Punctures averaging several to many diameters apart in most specimens, but most punctures no more than one diameter apart in single female from Karen, Kenya.

Male forefemoral notch. Notch setae are evanescent in Zimbabwean and southern African specimens, but easily visible in those from Israel, Kenya, and Tanzania.

Male sternum VIII (Figs. 180a-c). The apicomedian projection may be either broad, conspicuous (e.g., specimens from Karen and Marich Pass, Kenya, Namutoni area, Namibia, and Redbank, Zimbabwe, January 1995; one from Kami Ruins, Zimbabwe), or well defined, narrow (other specimens from Zimbabwe including those from Redbank, December 1995; those from Mount Kasigau, Kenya, Mkomazi area, Tanzania, and Karasburg District, Namibia; most from South Africa), short and rounded (single male from Taita Discovery Centre, Kenya, some from Pretoria), or short and divided (some from Pretoria), or evanescent (specimens from Bat Yam, Israel, some from Pretoria).

Male frontal setae. Golden in males with partly or all red gaster, in those with an all black gaster mostly silvery but golden in some.

Geographic distribution (Fig. 170).— Middle East (Israel, Syria), Senegal, Nigeria, Kenya and Tanzania, and southern Africa: Angola, Namibia, Zambia, Zimbabwe, South Africa. The gaps between Middle East, Senegal, Nigeria, and Kenya most likely result from inadequate collecting.

Records.— ANGOLA: River Giraul 10 mi NE Namibe (1 ♀, BMNH). **ISRAEL** (Pulawski, 1971, if not indicated otherwise): Bat Yam 3 km S Jaffa (4 ♀, 2 ♂, paratypes of *verhoeffi*), Beersheba, Haifa, Jaffa, Nir Am 10 km E Ghaza, Raanana 15 km NNE Tel-Aviv. **KENYA**: **Coast Province**: Kisima Rock at 3°51′S 38°46′E (1 ♂), Mount Kasigau (2 ♂), Taita Discovery Centre; Galla Hill area (1 ♂). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♀). **Nairobi**: Karen (1 ♀). **Rift Valley Province**: Magadi road 46 air km SW Nairobi (1 ♀) and 26 mi SW Nairobi (1 ♀, 2 ♂), Marich Pass Field Studies Centre (1 ♂). **NAMIBIA**: **Mariental District**: Mariental to Keetmanshoop at 24°50′S 17°56′E (1 ♂, AMG). **Karasburg District**: Gelaus 6 [Farm] (1 ♀, 1 ♂, NMN). **Otjiwarongo District**: 18 km NE Kalkfeld (1 ♀), 20 km NE Otjiwarongo (1 ♀). **Rundu District**: 125 km SW Rundu (1 ♀, MS). **Swakopmund District**: 114 km N Swakopmund at 21°51′S 14°05′E (1 ♀, AMG). **Tsumeb District**: 30 km E Namutoni (1 ♂, MS). **Windhoek District**: Arnhem Farm 110 km E Windhoek (1 ♀, LACM), Nam Lodge at approximately 22.8°S 18.2°E (1 ♀, BMNH). **NIGERIA**: Ibadan (1 ♀, BMNH). **SENEGAL**: Simenti in Nikolo Koba National Park (1 ♀,

OÖLM). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (3 ♂, TMP), 28 air km N Bedford at 32°29′S 26°02′E (2 ♀, 3 ♂), NNW Bedford at 32°33′S 26°00′E (4 ♀), Colchester at 33°42′S 25°50′E (9 ♂), 7 km S Cradock (1 ♀, OÖLM), Fort Beaufort: "Umdala" (1 ♀, SAM), Goodehoop Farm 16 km W Steytlerville (1 ♂, USU), Grahamstown: Botanical Garden at 33°18′26″S 26°31′41″E (1 ♂, OHL), 30 km W Grahamstown (2 ♂, OÖLM), 18 km WNW Grahamstown: Hilton Farm (1 ♂; 1 ♀, AMG), Kirkwood (1 ♀, 2 ♂, OÖLM), Olifantskop Pass 30 km W Grahamstown (1 ♂, OÖLM), Papiesfontein at 33°58′S 24°59′E (1 ♀, SAM), 28 km S Steytlerville: Wolwekraal Farm (2 ♀, USU), Table Farm 10 km NW Grahamstown (3 ♀, AMG), Willowmore (2 ♂, OHL; 1 ♀, 1 ♂, TMP, lectotype and paralectotype of *unguiculatus*), 9 km E Willowmore (2 ♂), 43 km NE Willowmore: Plessierivier (1 ♂, USU), 37 km NW Willowmore in Grootrivierberg Range (1 ♂, USU), 6 km S Willowmore at 33°20′S 23°27′E (1 ♂), 11 km SW Willowmore at 33°22.3′S 23°24.7′E (6 ♂, USU). **Free State**: Sandveld Nature Reserve ca 5 air km E Bloemhof at 27°40′S 25°41′E (6 ♂). **Gauteng**: Pretoria (1 ♂, AEI), Pretoria: Botanical Garden (2 ♀, 7 ♂), Tswaing (1 ♀). **Kwazulu-Natal**: SW Emanguzi (3 ♀, 8 ♂, OÖLM), Mbazwana (3 ♂), Tembe Elephant Park (2 ♀, 1 ♂, OÖLM), 10 km W Utrecht (1 ♂, OÖLM). **Mpumalanga**: Skukuza in Kruger National Park (1 ♀, 3 ♂, PMA). **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♂, PPRI). **Northern Province**: Ellisras (2 ♀, AMG), Guernsey Farm 15 km E Klaserie (1 ♀, PMA), Langjan Nature Reserve (3 ♂, PPRI), Mooketsi (1 ♀, USNM), 7 km E Mopane which is about 22°40′S 29°50′E (1 ♀, AMNH), Nwanblya waterhole near Shingwedzi in Kruger National Park (1 ♀, ZMAN), 5 mi W Warmbad (1 ♀, USNM). **North-West Province**: Platriver (1 ♀, TMP, paratype of *harpax*). **Western Cape Province**: Bo Kouga in Uniondale District (1 ♀, SAM), Cape of Good Hope Nature Reserve near Olifantbosbaai (3 ♀, 1 ♂), 20 km N Citrusdal (1 ♀, 1 ♂; 1 ♀, 1 ♂, OÖLM), Clanwilliam (1 ♀, AMNH), Gouph in Laingsburg District (1 ♀, SAM), Lambert's Bay (1 ♂, OÖLM), Langberg (1 ♂, OÖLM), Ratelfontein in Graafwater District (1 ♀, AMG), Swartrivier 7 km NW Prince Albert (3 ♀, 5 ♂), Swellendam (1 ♀, BMNH), Tierberg Farm 23 km NE Prince Albert (13 ♀, 11 ♂), Worcester (1 ♂, BMNH). **SYRIA**: Qualalat-el-Hosn (= Krak des Chevaliers) 40 km W Homs (1 ♀, MSNT, paratype of *verhoeffi*). **TANZANIA**: **Arusha Region**: Arusha (1 ♀, ZMAN). **Coast Region**: 60 km ENE Morogoro (2 ♂). **Iringa Region**: 18 km W Iringa (1 ♀). **Morogoro Region**: 48 km W Morogoro (1 ♀). **Tanga Region**: 2 km NE Mkomazi (1 ♂). **ZAMBIA**: **Eastern Province**: lower Luangwa River (1 ♀, BMNH), upper Luangwa River (1 ♀, BMNH), Nyamadzi River near Nawalia [N Sinda] (1 ♀, BMNH). **ZIMBABWE**: Antelope 100 km S Bulawayo (1 ♂, OÖLM), Bubye River 80 km NE Beit Bridge (2 ♀, 2 ♂, OÖLM), Bulawayo (1 ♀, AMG), Bulawayo: Hillside (1 ♂), Kami Ruins (2 ♂, AMG), Marondera (as Marandellas, 1 ♂, AEI), Matobo National Park (1 ♀, USNM), 11 km NE Nyamandhlovu (1 ♀, 3 ♂), Redbank at Kami River (3 ♀, 8 ♂), Sawmills (1 ♀, SAM, holotype of *harpax*), Victoria Falls (1 ♀, 9 ♂).

Tachysphex helveticus aegyptiacus Morice

Figures 177, 181.

Tachysphex aegyptiacus Morice, 1897:306, ♀, ♂. Lectotype: ♂, Egypt: Choubra (OXUM), **present designation**, examined.— Storey, 1916:110 (Egypt); Honoré, 1942:55 (in checklist of Egyptian Sphecidae).— As *Tachysphex helveticus* var. *aegyptiacus*: de Beaumont, 1940b:176 (new status).— As *Tachysphex helveticus aegyptiacus*: de Beaumont, 1947a:200 (new status, in revision of Egyptian *Tachysphex*); Pulawski, 1971:177 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed).

TYPE LOCALITY.— I have examined two syntypes of *aegyptiacus*, a female and a male, and have selected the male as the lectotype. It is labeled "Choubra 16.5.[18]96". The locality Choubra is not listed in the available maps and gazetteers, but according to Morice (1897) the species was collected near Cairo and at Suez. I accept that Choubra is in the vicinity of Cairo.

RECOGNITION.— *Tachysphex helveticus* Kohl is an all black species, with a flat labrum, mid-tarsomere II more than twice as long as apically wide, apical tarsomeres without spines on venter or lateral margins, and the anal end of hindwing crossvein cu-a as far from the wing base as the cubital end or slightly closer. Furthermore, the mesopleural punctures are well defined, the setae are erect on the postocellar area and midfemoral venter, diverging obliquely anterad from the propodeal dorsum's midline, and at least terga I–III are silvery fasciate.

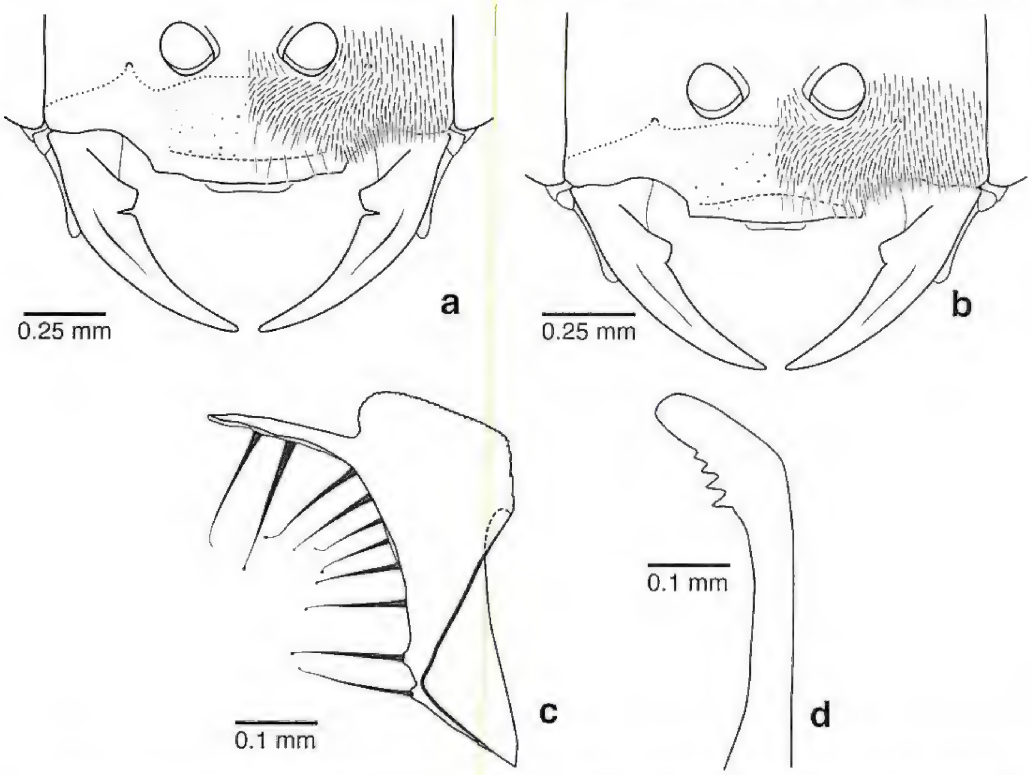

FIGURE 181. *Tachysphex helveticus aegyptiacus* Morice: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

The female share with *aterrimus* and *fugax* an almost flat middle clypeal section. As in *fugax*, most punctures of this section are about one diameter apart, and the clypeal setae are dense, concealing the integument (except anteromesally). In *aterrimus*, the punctures of the middle clypeal section are more than one diameter apart, and the clypeal setae are sparse, not concealing the integument. Unlike *fugax*, the female flagellum is short in *helveticus* (e.g., the dorsal length of flagellomere I is about 2.3 × apical width rather than 4.0–4.5).

The male of *helveticus* differs from similar species in having a well-defined corner of the clypeal lip and the outer apical spine of foretarsomere II longer than foretarsomere III.

The punctate frons with shiny interspaces and the presence of a silvery setal fascia on terga I–IV are subsidiary recognition features of the African populations of this species, i.e., of *helveticus aegyptiacus*.

SUBSPECIES IN *TACHYSPHEX HELVETICUS*.— Pulawski (1971) recognized three subspecies of *helveticus* Kohl: *helveticus aegyptiacus* (Egypt, now also known from Niger), *helveticus helveticus* (Europe to Kazakhstan, Uzbekistan, Tajikistan, and Mongolia), and *helveticus quadrifasciatus* Pulawski (Cyprus, Jordan, Tajikistan), characterizing them as follows: in *helveticus helveticus*, the frons is markedly microsculptured and dull between the punctures, slightly punctatorugose in some specimens, and only terga I–III are silvery fasciate apically. In *helveticus quadrifasciatus*, the frons is also dull and microsculptured, but silvery fasciate apically are terga I–IV. In *helveticus aegyptiacus*, the frontal integument is shiny, unsculptured or only finely microsculptured between the punctures, and terga I–IV are silvery fasciate apically. Contrary to the original description, the cor-

ner of the male clypeal lip in *helveticus quadrifasciatus* may be either obtuse or sharp.

In reality, the relationships of these subspecies appear to be more complex. First, in specimens from Kazakhstan, the frons is somewhat shiny, although less so as in the Egyptian populations. Second, I now know specimens of both *helveticus helveticus* and *helveticus quadrifasciatus* from Cyprus, although not from identical localities. This suggests either full intergradation or reproductive isolation. Third, in a paratype male of *helveticus quadrifasciatus* from Turkey, the frons is as shiny as in some Egyptian specimens. Possibly these subspecies do not warrant recognition and should be synonymized. On the other hand, *helveticus aegyptiacus* is geographically isolated from the other populations (e.g., no *helveticus* has ever been found in North Africa west of Egypt) and may be a vicariant species.

Description.— Scutal punctures well defined, mostly less than one diameter apart, but many discal punctures up to two or three diameters apart. Mesopleural punctures well defined, averaging more than one diameter apart below scrobe, several diameters apart in many specimens; interspaces shiny. Episternal sulcus complete except in some females. Propodeal dorsum irregularly rugose or irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate.

Setae erect on postocellar area, erect on each side of oral fossa next to occipital carina (about 1.5 × midocellar diameter long), suberect on scutum anteriorly (about two midocellar diameters long), on propodeal dorsum diverging obliquely anterad from midline, suberect on midfemoral venter (longest setae about one midocellar diameter long).

Head and thorax black, mandible yellowish red mesally. Frontal setae, in both sexes, silvery except with golden tinge near midocellus. Wing membrane slightly infumate in female, almost hyaline in most males; costal vein of forewing yellowish brown, subcostal vein brown. Gaster and legs black, tarsal apex brown. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 181a): middle section almost flat, bevel markedly shorter than basomedian area in most cases, but almost as long as bevel in some specimens; lip free margin arcuate, not incised laterally. Width of postocellar area 2.1–2.4 × length. Dorsal length of flagellomere I 1.6–1.9 × apical width. Dorsal foretibial surface with a few fine bristles; outer surface with one spine. Forebasitarsus with 5–7 rake spines. Apical depression of tergum V varying from unsculptured and asetose to microscopically punctate and setose. Pygidial plate with ill-defined punctures that average many diameters apart; interspaces unsculptured. Length 5.8–7.8 mm.

♂.— Mandible: trimmal carina with tooth and rudimentary cleft. Clypeus (Fig. 181b): bevel about as long as basomedian area to nearly reduced, in most specimens markedly shorter than basomedian area; lip free margin straight or slightly arcuate, with well-defined corner; distance between corners 1.2–1.6 × distance between corner and orbit. Width of postocellar area 2.5–3.1 × length. Dorsal length of flagellomere I 1.0–1.3 × apical width, ventral length equal to apical width or nearly so. Forefemoral notch setose to glabrous. Outer margin of forebasitarsus with 3–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Tergum VII mesally with minute punctures that are several to many diameters apart. Length 4.4–5.9 mm. Volsella and penis valve: Figs. 181c, d.

Nesting behavior.— No observation has been conducted on the behavior of *helveticus aegyptiacus*, but Olberg (1959) and Bonelli (1972) studied *helveticus helveticus*, respectively, in Germany and Italy. Their data are summarized below.

The nest is established in sandy soils, and the female digs the gallery with her forelegs, the evacuated sand being thrown behind under her body. From time to time, she levels the accumulated sand mound, also using her forelegs. Small pebbles (some of which may be three times the wasp's head in diameter) are removed in her mandibles and deposited at some distance, either by dragging them backward, or in flight. According to Olberg, removal of pebbles preceded digging

because the nesting site was densely covered with them. All the nests studied by Olberg were unicellular, but Bonelli observed bicellular nests as well. After completion of the nest, the mother wasp performs an orientation flight or walks around the entrance, then goes hunting. The nest entrance remains opened when she is away. The prey, nymphal acridids, are flown to the nest, head to head and venter to venter, and deposited at the nest entrance. The wasp then enters the nest headfirst, turns around, grabs the prey, and pulls it inside. Two to five nymphs are stored per cell. The prey observed by Krombein (1972) on the island of Crete was probably *Calliptamus italicus* (Linnaeus).

GEOGRAPHIC DISTRIBUTION (Fig. 177).— Egypt to Niger.

RECORDS.— **EGYPT**: **Al Fayyum**: Kom Osheim (6 ♀, 5 ♂). **Al Jizah** (= Ghiza): Abu Rawash (3 ♀, 3 ♂), Ghiza (9 ♀, 1 ♂), Manshiet Radwan (1 ♂), Saqqara (1 ♀). **Al Qahirah** (= Cairo): Geziret-el-Zamalik (= Jazirah Island) (1 ♀, OXUM, paralectotype of *aegyptiacus*); Maadi (4 ♀, 3 ♂). **Aswan**: Aswan (5 ♀, 1 ♂). **Sawhaj**: Abydos (2 ♀, 3 ♂). **Location unknown**: Choubra, probably near Cairo (1 ♂, lectotype of *aegyptiacus*). **NIGER**: Niamey (1 ♀, KMG).

Tachysphex hermia Arnold

Figures 182, 183.

Tachysphex hermia Arnold, 1924:53, ♀, ♂ (as *Hermia*, incorrect original capitalization). Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:274 (listed).

RECOGNITION.— *Tachysphex hermia*, known from Zimbabwe and Namibia, is characterized by: gaster, femora, and tibiae black; mesopleuron shiny, with well-defined punctures (that are less than one diameter apart); setae erect on postocellar area (Figs. 182a, b), nearly erect on scutum and midfemoral venter, and inclined obliquely anterad on propodeal dorsum; labrum flat, not emarginate; and tarsi unspecialized (length of midtarsomere II more than twice length and that of hindtarsomere IV more than width, apical tarsomeres without spines on venter or lateral margins).

The female of *hermia* differs from other species with these characteristics except some *titania* in having a mesally projecting clypeal lip (Fig. 182c). Subsidiary recognition features include: apical part of galea (distad of crease) densely punctate (denser than basal area) and slightly wider than long in profile (in *titania* sparsely punctate and slightly longer than wide), clypeal lip not incised laterally and middle section evenly convex, setae straight on scutum and mesopleuron (sinuous in many *diversilabris*), and tarsi not elongate (length of hindtarsomere IV about 1.2 × apical width, whereas 1.7 × apical width in *longipes*).

The male of *hermia*, like that of *diversilabris*, *longipes*, and *titania*, has a pointed clypeal lobe, but the oblique carina that emerges from the clypeal midpoint ends in a small tubercle (Fig. 182d); the carina simply effaces in the other species. Also, the male of *hermia* has simple flagellomeres (flagellomeres III–X each with a longitudinal sulcus in *diversilabris*), the distal portion of the galea densely punctate and slightly wider than long in profile (slightly longer than wide in *titania*), apical tarsomeres not elongate (length of hindtarsomere IV 1.2 × apical width, whereas 1.5 × apical width in *longipes*), and sternum VIII evenly emarginate (sternum VIII tridentate in most *diversilabris*).

DESCRIPTION.— Apical portion of galea (distad of crease) densely punctate, markedly more so than basal portion, in profile slightly shorter than wide. Mandible: outer ridge somewhat swollen and expanded over notch. Scutal and mesopleural punctures well defined, relatively large; scutal punctures averaging less than one diameter apart (several discal punctures may be 1–2 diameters apart); mesopleural punctures less than one diameter apart anteriorly and more that one diameter posteriorly. Propodeal dorsum irregularly rugose, mostly also with irregular, longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin carinate basally.

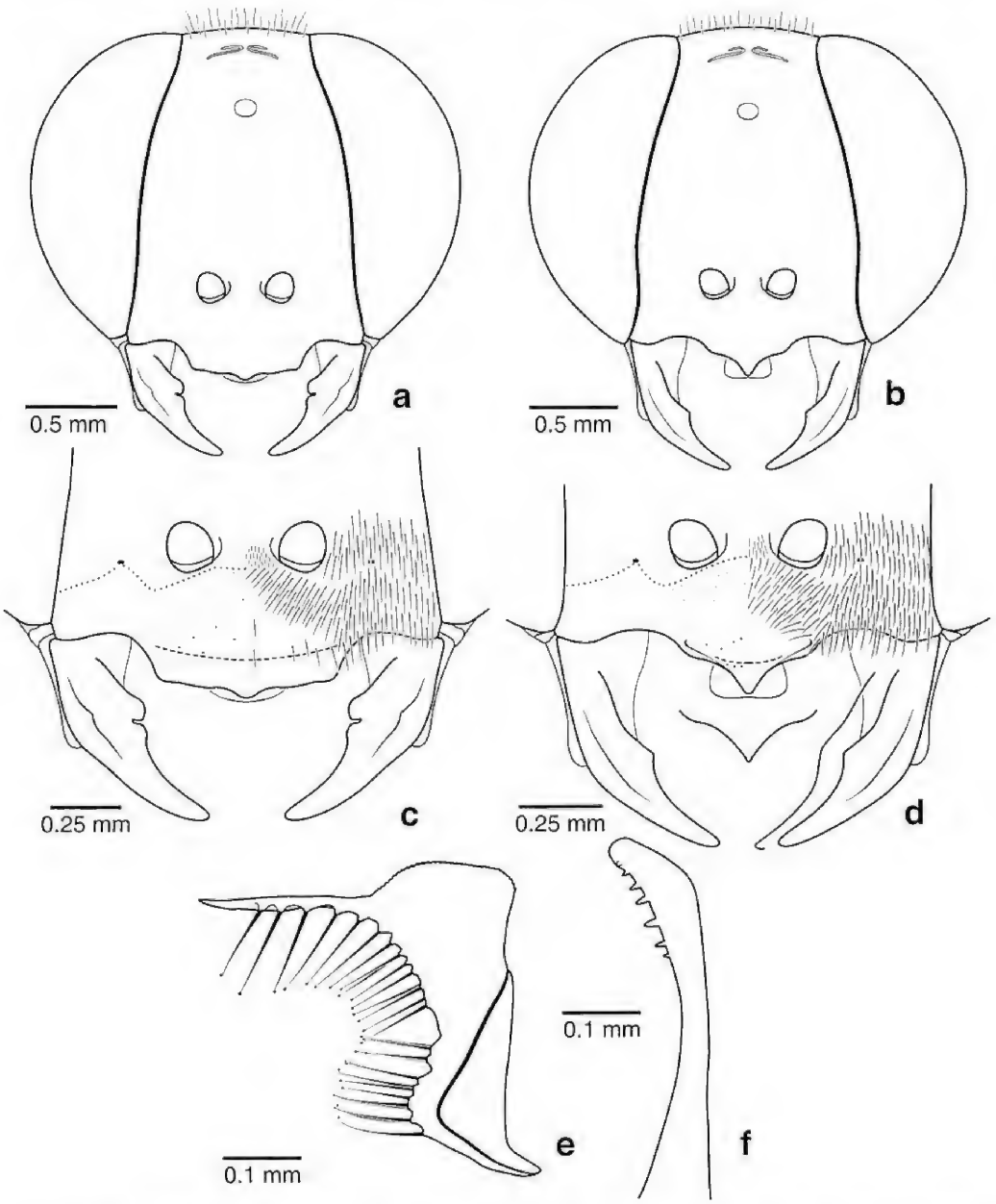

FIGURE 182. *Tachysphex hermia* Arnold: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible with outline showing variation of clypeal free margin and of mandible; e – volsella; f – penis valve.

Setae erect, straight or sinuous on postocellar area (Figs. 182a, b); suberect, curved or sinuous on scutum anteriorly; inclined anterad on propodeal dorsum. Setal length (expressed as a fraction of basal mandibular width): 0.8 on postocellar area, 0.4–0.5 on each side of oral fossa next to occipital carina, 0.5–0.7 on scutum anteriorly.

Head, thorax, legs, and gaster black except mandible reddish mesally and tarsal apex brown. Frontal setae silvery in both sexes, but golden in single female from Harare area. Wing membrane slightly infumate to nearly hyaline, forewing costal and subcostal veins brown. Terga I–IV (I–III in some males) silvery fasciate apically.

♀.— Clypeus (Fig. 182c): bevel shorter than basomedian area; lip free margin arcuate, roundly prominent mesally, not incised laterally. Width of postocellar area 1.8–2.0 × length (Fig. 182a). Dorsal length of flagellomere I 2.2–2.4 × apical width. Forefemoral venter with minute punctures that are several diameters apart. Foretibial outer surface without spines or with one spine near midlength. Forebasitarsus with seven or eight rake spines. Apical depression of tergum V microsculptured and setose throughout. Length 8.0–9.2 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Fig. 182d): bevel shorter than basomedian area; lip free margin acutely pointed, without corner (forming single curved line with rest of clypeal margin); oblique carina emerging from clypeal midpoint ends in minuscule tubercle that is close to free margin. Width of postocellar area 2.0–2.2 × length (Fig. 182b). Dorsal length of flagellomere I 1.4–1.6 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length 5.2–6.7 mm. Volsella and penis valve: Figs. 182e, f.

Collecting period.— 24 May through 27 July (Zimbabwe), 27 August (Namibia).

Geographic distribution (Fig. 183).— Zimbabwe, Namibia.

Records.—NAMIBIA: Lüderitz District: 31 km SSE Grillenthal at 27°14′S 15°28′E, ex shell of snail *Trygonephrus* (1 ♀, AMG). **ZIMBABWE**: Bulawayo (1 ♀, 1 ♂, paratypes; 2 ♀, 3 ♂, SAM, including ♀ lectotype, 1 ♂ paralectotype, 1 ♀ and 1 ♂ paratypes; 1 ♂, TMP), near Harare [probably Chishawasha] (1 ♀, RMNH), Umguza River near Bulawayo (2 ♂, SAM).

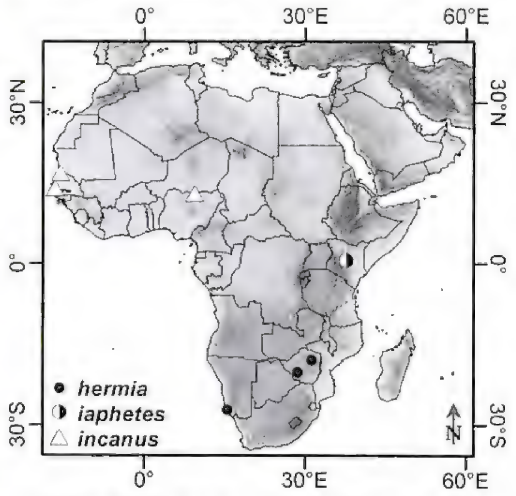

Figure 183. Collecting localities of *Tachysphex hermia*, *iaphetes*, and *incanus*.

Tachysphex hippolyta Arnold

Figures 184–186.

Tachysphex hippolyta Arnold, 1924:59, ♀ (as *Hippolyta*, incorrect original capitalization). Holotype: ♀, Zimbabwe: Sawmills (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); de Beaumont, 1967:509 (misdetermination, actually *Tachysphex argentifrons*); Bohart and Menke, 1976:274 (listed).

Tachysphex viarius Arnold, 1947:149, ♂. Holotype: ♂, Zimbabwe: Vumba Mts. (SAM), examined. **New synonym.**— Bohart and Menke, 1976:277 (listed).

Recognition.— The female of *hippolyta* has tarsomeres IV wider than long, with the dorsoapical emargination broadly obtuse (almost straight), apicoventral margins of tarsomeres III–V projecting or at least convex mesally, tarsomeres V angulate basoventrally, and on each leg one claw smaller than the other. It differs from most other species with these characteristics in having the following combination: legs and gaster all black, forebasitarsus with 8–10 rake spines (of which at least the apical three have their sockets confluent), and dorsal length of flagellomere I equal to

1.8–1.9 of apical width. Unlike *argentifrons*, the forefemur of *hippolyta* is densely setose (Fig. 184c), at most with a narrow, sparsely setose area ventrally, and the outer and inner margins of foretarsomere IV are almost equal in length (rather than conspicuously unequal); unlike *venator*, the clypeal lip of *hippolyta* has two lateral incisions on each side (Fig. 184a), rather than one. Also, proportions of flagellomere I are slightly different (dorsal length 1.8–1.9 × apical width, while 1.4–1.6 × in *argentifrons*, 2.5 × in *venator*).

The male of *hippolyta* has a distinctive, obtusely expanded lateral margin of the apical tarsomeres, best seen in the oblique, dorsolateral view (Fig. 184e). The apical tarsomeres are also expanded in *auropilosus*, the Madagascan *scaurus*, and the Oriental *changi* Tsuneki, in which, however, a few small spines emerge from the expansion (spines absent in *hippolyta*). Subsidiary recognition features of *hippolyta* are: free margin of clypeal lip pointed mesally and with well-defined corner, concave between midpoint and corner (Fig. 184b); propodeal dorsum with setae slightly inclined posterad, nearly erect; apical tarsomeres with central cluster of small spines (Fig. 184f); gaster black and tibiae in most specimens red.

Justification of new synonymy.— The holotypes of *hippolyta* and *viarius* are opposite sexes of one species. These two names are therefore synonyms.

Description.— Scutal punctures well defined, averaging 1–2 diameters apart in female, about one diameter in male; interspaces microsculptured. Mesopleural punctures well defined in female and many males, ill defined in some males; interspaces varying from dull to shiny. Propodeal dorsum rugose, evenly microareolate in many males; side varying from ridged to not ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I with obtuse, longitudinal carina.

Setae erect on each side of oral fossa next to occipital carina; erect on postocellar area (length about 1.5 × midocellar diameter), nearly erect on scutum (length less than midocellar diameter); nearly erect (slightly inclined posterad) on propodeal dorsum.

Head and thorax black, mandible dark red at about two thirds of length. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate; forewing costal vein light brown, subcostal vein dark brown. Femora black; tibiae and tarsi black in female (tarsal apex brown), red in most males but black in those from 128 km NW Morogoro, Tanzania. Gaster black. Terga I–III silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 184a): bevel as long as basomedian area or shorter; lip free margin arcuate, emarginate mesally in most specimens, with two lateral incisions on each side. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.8–1.9 × apical width. Scutum and scutellum flattened. Forefemoral venter with minute punctures that average several diameters apart, densely setose (Fig 184c), at most narrow, ventral zone sparsely setose. Dorsal foretibial surface with a few, fine bristles; outer surface without spines, with a few bristles. Forebasitarsus with 8–10 rake spines, of which at least the apical three have confluent sockets. Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical emargination very broad (almost straight) and apicoventral margin obtusely prominent. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; each lateral margin with row of small spines subbasally; apicoventral margin produced into lobe (Fig. 184d). Outer claws of mid- and hindtarsi shorter, thinner than inner claws (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous (all or largely so). Pygidial plate with punctures that average many diameters apart; interspaces shiny, aciculate or unsculptured. Length 7.0–9.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft in most specimens, but tooth low, obtuse, and cleft absent in one specimen from Umguza River, Zimbabwe. Clypeus (Fig. 184b): bevel not differentiated; lip free margin pointed mesally, with well-defined corner (margin somewhat concave between midpoint and corner); distance between corners 0.9–1.0 × distance between corner and

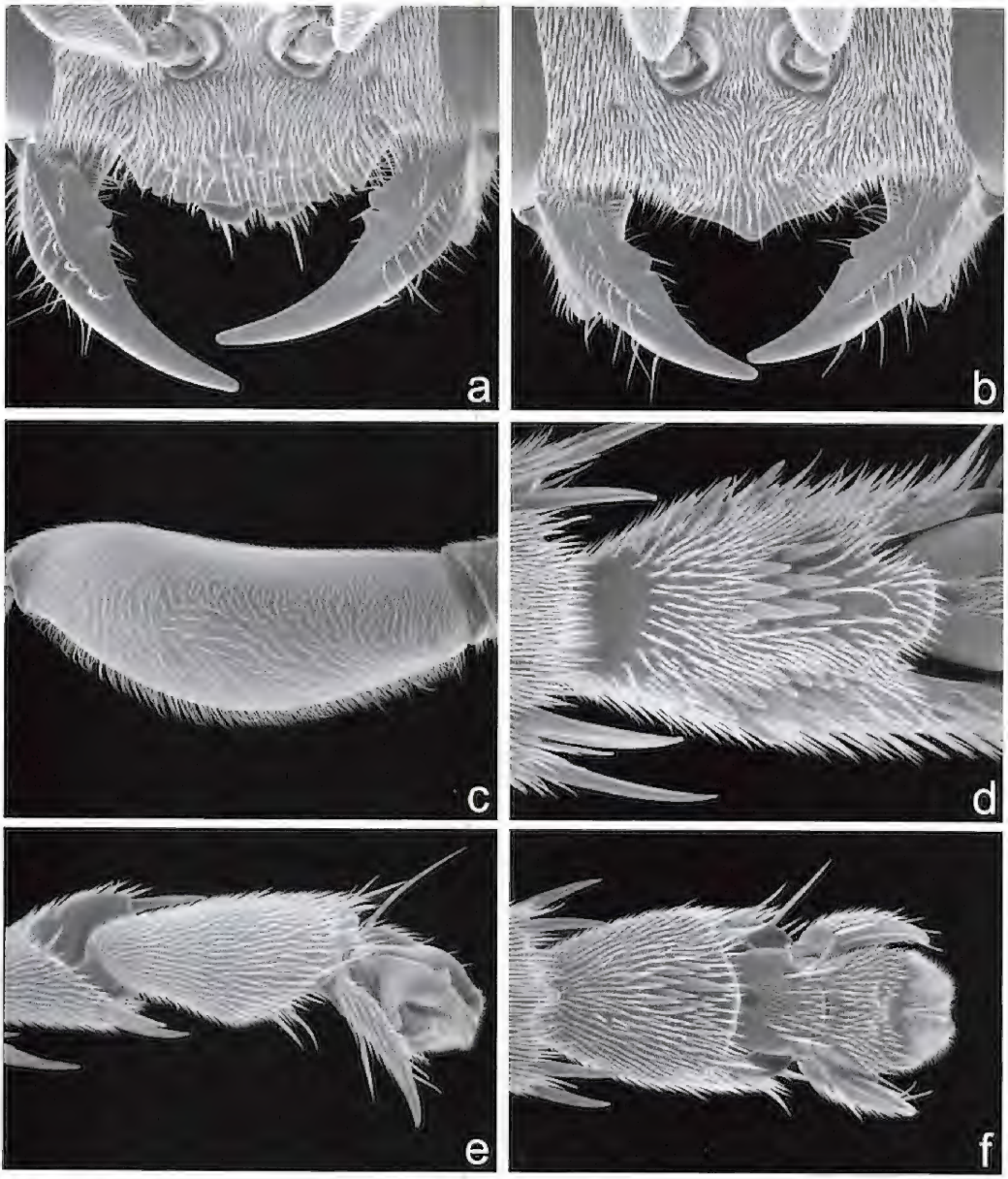

FIGURE 184. *Tachysphex hippolyta* Arnold: a – female clypeus and mandible (×41); b – male clypeus and mandible (×40); c – female forefemur (×48); d – female hindtarsomere V in ventral view (×203); e – male hindtarsomere V in lateral oblique view (×151); f – male hindtarsomere V in ventral view (×129).

orbit. Width of postocellar area 0.7–1.0 × length. Dorsal length of flagellomere I 1.3–1.6 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Tarsomeres V: each lateral margin obtusely angulate, without spines (Fig. 184e), venter with central cluster of small spines (Fig. 184f). Length 6.6–8.3 mm. Volsella and penis valve: Fig. 185.

GEOGRAPHIC DISTRIBUTION (Fig. 186).— South Africa to Angola and Kenya.

RECORDS.— **ANGOLA**: 16 mi W Paiva Couceiro (1 ♂). **KENYA**: **Coast Province**: Wundanyi (2 ♂; 1 ♀, 7 ♂, OÖLM). **Eastern Province**: 94 km E Thika (1 ♀). **MOZAMBIQUE**: Maputo (1 ♂, ANSP). **NAMIBIA**: **Karibib District**: 62 km E Karibib (1 ♀, MS). **SOUTH AFRICA**: **Eastern Cape Province**: 18 km WNW Grahamstown: Hilton Farm (1 ♀, 1 ♂, AMG). **Gauteng**: Pretoria (2 ♀, 4 ♂, AEI; 2 ♀, OÖLM), Pretoria: Botanical Garden (4 ♀, 1 ♂), Rietvlei (= van Riebeck) Nature Reserve at 25°52′S 28°16′E (1 ♀), Tswaing (1 ♀). **Kwazulu-Natal**: Fanies Island Camp, St. Lucia, at 28°10′S 32°25′E (1 ♀, PPRI). **Mpumalanga**: Barberton (1 ♂, PPRI), Kaapsehoop (1 ♀, AMG), Kruger National Park: Pretoriuskop (1 ♀, USNM), Satara (1 ♂, PMA), and Skukuza (1 ♀, 2 ♂, PMA), Loskop Dam Nature Reserve (1 ♀, PPRI). **Northern Province**: D'Nyala Nature Reserve (1 ♂, PPRI), Ellisras (1 ♂, AMG), Guernsey Farm 15 km E Klaserie (14 ♀, 32 ♂, PMA), Guernsey Farm 20 km E Klaserie (1 ♀, PMA), Langjan Nature Reserve (1 ♂, PPRI), Modjadji Nature Reserve (1 ♀, PPRI), 30 km E Nylstroom (8 ♂, PMA), Nylsvley Nature Reserve (1 ♂, PPRI), Pafuri in Kruger National Park (1 ♀, PPRI), 20 km SE Potgietersrus (2 ♂, PMA), Thabazimbi: Ben Alberts Nature Reserve at 24°37′S 27°23′E (1 ♀), 5 mi W Warmbad (1 ♀, USNM). **North-West Province**: Rustenburg Nature Reserve (3 ♀, PPRI). **TANZANIA**: **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya (1 ♂, SAM) and Kikolo Plot (1 ♂; 1 ♂, SAM). **Morogoro Region**: 128 road km NW Morogoro (2 ♂). **ZAMBIA**: 60 km NW Kapiri Mposhi (2 ♂, OÖLM). **ZIMBABWE**: Bulawayo (1 ♀, AMG), Bulawayo: Umguza River (5 ♂; 1 ♂, NHMZ), 15 km S Chipinge (2 ♂, OÖLM), 40 km S Chipinge near Mt. Selinda (2 ♀, OÖLM), Chirinda Forest Land near Mt. Selinda (2 ♀, OÖLM), 30 km W Harare (2 ♀, 1 ♂, OÖLM), Lion and Cheetah Park 24 km W Harare (3 ♀, 4 ♂; 1 ♀, NHMZ), Matobo (1 ♀, FSCA; 1 ♀, OÖLM), Mt. Selinda (11 ♂, OÖLM), Nyika 80 km E Masvingo (1 ♀, OÖLM), Redbank: Kami River (2 ♂), Sawmills (1 ♀, SAM, holotype of *hippolyta*), Umtali (1 ♂, SAM), Victoria Falls (1 ♀, 2 ♂), Vumba Mts. (5 ♂, SAM, including holotype and paratype of *viarius*).

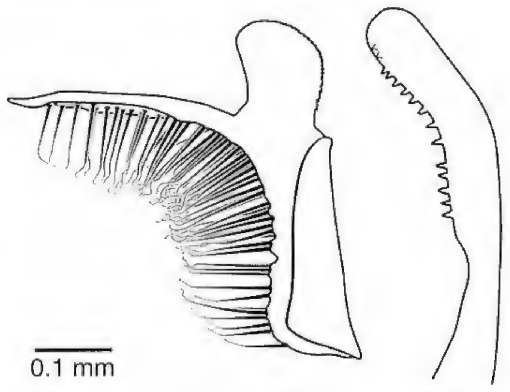

FIGURE 185. *Tachysphex hippolyta* Arnold: volsella and penis valve.

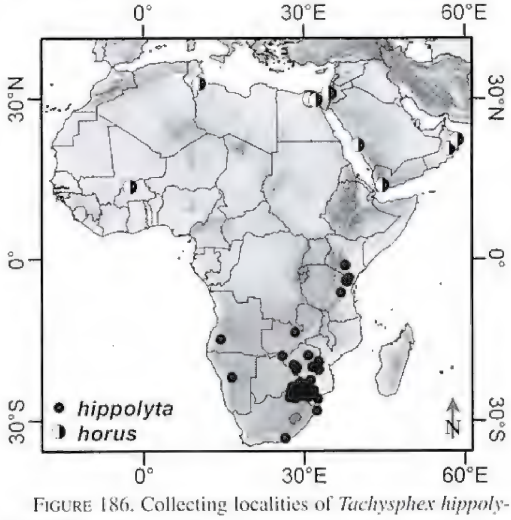

FIGURE 186. Collecting localities of *Tachysphex hippolyta* and *horus*.

Tachysphex horus de Beaumont

Figures 186, 187.

Tachysphex horus de Beaumont, 1940:168, ♀, ♂ (♂ = *Tachysphex luxuriosus*). Holotype: ♀, Egypt: Heliopolis (Ministry of Agriculture of Egypt), not examined.— de Beaumont, 1947a:171 (in revision of Egyptian *Tachysphex*, ♂ = *Tachysphex luxuriosus*), nec 1956a:197 (= *Tachysphex luxuriosus*); Pulawski, 1964:91 (Egypt; redescription), 1971:350 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Bohart and Menke, 1976:274 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

Recognition.— *Tachysphex horus* is similar to *geniculatus*, *inextricabilis*, *luxuriosus*, and *niloticus*, with which it shares the shape of the labrum, postocellar area, female mandible, and clypeus, setae short on the postocellar area and appressed on tergum I, and nonemarginate male forefemora (see *geniculatus*, p. 306, for details). As in *geniculatus* and *niloticus*, its propodeal side is glabrous along the metapleural sulcus, scutal hindcorner is not prominent, and the setae of the postocellar area are erect in the male.

The female of *horus* differs from *geniculatus* in having the setae appressed on the postocellar area, and concealing the integument of the anterolateral scutum and of mesopleuron (at least in fresh specimens). Also, the gaster is red at least basally in *horus*, but all black in many *geniculatus*. Unlike *niloticus*, the setae of *horus* conceal the integument of the forecoxa and the hindfemoral outer surface.

The male of *horus* differs from *geniculatus* in having a somewhat denser body vestiture. The setae, in particular, fully conceal the integument between the midocellus and antennal socket, at least in the lower half, whereas in most *geniculatus* the integument is visible from all or most angles. The Egyptian specimens differ from *geniculatus* in having a rounded apex of the penis valve, but the penis valve is practically identical in specimens from other areas. The rounded dorsal volsellar process of *horus* (Fig. 187) immediately differentiates it from *niloticus*, the outer apical spine of foretarsomere II is shorter than tarsomeres III and IV combined, and the punctures of the mesothoracic venter are about one diameter apart (about two diameters in occasional specimens). In *niloticus*, the outer apical spine of foretarsomere II is as long as tarsomeres II and III combined, and the puncture are many diameters apart anterad on each midcoxa.

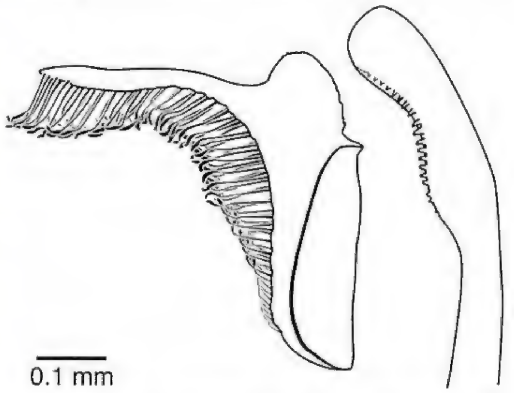

Figure 187. *Tachysphex horus* de Beaumont: volsella and penis valve.

Description.— Labrum convex, conspicuously protruding beyond clypeal free margin. Galea minutely punctate (punctures about 1–2 diameters apart except anteriorly), as long as scape. Scutal punctures well defined, on disk averaging about one diameter in female and 1–2 diameters in male. Mesopleuron coriaceous, dull. Punctures of mesothoracic venter, anterad of midcoxa, many diameters apart in female, mostly about one diameter apart in male (about two diameters in occasional males). Propodeal dorsum microscopically areolate to microscopically rugose, in many specimens also with irregular longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area in female but erect in male (about as long as midocellar diameter); erect on each side of oral fossa next to occipital carina (setal length up to 0.4 × basal mandibular width); appressed on scutum; in fresh females fully concealing integument of frons, scutum anterolaterally, and mesopleuron; in male suberect on mesopleuron; variably oriented on propodeal dorsum (either anterad or posterad); propodeal side asetose next to metapleural sulcus. Sternum I varying from glabrous to setose.

Head and thorax black, mandible reddish except apically in female, reddish mesally in male; clypeal bevel reddish, also lip in many females. Frontal setae silvery in both sexes. Wing membrane hyaline; costal and subcostal veins of forewing yellowish. Femora black except apically, tarsi red. Color of tibiae and gaster: see below. Terga I–V silvery fasciate apically.

♀.— Clypeus (as in Fig. 161c): bevel about as long as basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip somewhat ill defined, its free margin slightly convex to nearly straight, at most minimally concave mesally, roundly emarginate laterally. Width of postocellar area 2.1 × length. Dorsal length of flagellomere I 2.3–2.9 × apical width. Forefemoral base, on anteroventral surface, with a few large punctures that are several diameters apart. Dorsal foretibial surface with three spines; outer surface with three spines. Midtrochanteral venter mostly shiny, unsculptured, except for a few, sparse punctures (impunctate zone evanescent in occasional specimens). Forebasitarsus with 7–9 rake spines. Venters of tarsomeres V each with thin, preapical spine. Apical depression of tergum V largely impunctate and glabrous. Pygidial plate with minute punctures that are many diameters apart, interspaces unsculptured or nearly so. Length 8.3–9.8 mm. Gastral segments I and II red or with black spots, remainder black. Tibiae red or foretibia partly black.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (as in Fig. 161d): bevel about as long as basomedian area or shorter; lip ill defined, its free margin almost straight to slightly arcuate, with obtuse corner; distance between corners about 1.2 × distance between corner and orbit. Width of postocellar area 2.0–2.6 × length. Dorsal length of flagellomere I 1.6–2.0 × apical width. Forefemur not emarginate. Outer margin of forebasitarsus with 3–5 rake spines; outer apical spine of foretarsomere II as long as or longer than tarsomere III. Sternum VIII: apical margin with or without median prominence (prominence rounded or emarginate mesally). Length 4.8–7.5 mm. Volsella and penis valve: Fig. 187. Gastral segments I and II or I–III red and remainder black, but all gaster black in some specimens. Tibiae largely black (red basally and apically) or midtibia largely and hindtibia all red.

COLLECTING PERIOD.— 12 February (Saudi Arabia), 31 March through 15 May (Egypt), 11 May (Israel), 6–7 August (Burkina Faso), 8–12 December (Oman).

GEOGRAPHIC DISTRIBUTION (Fig. 186).— Burkina Faso, Tunisia, Lower Egypt, Israel, Arabian Peninsula.

RECORDS.— **BURKINA FASO**: 4 km NW Ouahigouya at 13°37.0′N 2°27.6′W (1 ♀, 1 ♂). **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash (2 ♀, 16 ♂), Ghiza (6 ♀, 1 ♂), Saqqara (2 ♀, 1 ♂). **Al Qahirah** (= Cairo): Heliopolis (de Beaumont, 1940), Maadi (2 ♀). **As Suways** (= Suez): 13–22 km N Ain Sokhna (1 ♀). **Sina** (= Sinai): no specific locality (Roche and Zalat, 1994). **ISRAEL** (Pulawski, 1971): Ivulot, Revivim, also 32 km SE Beersheba = 5 km E Yeroham (1 ♀, 1 ♂; 2 ♀, 2 ♂, CSE). **OMAN**: 253 km S Nizwa at 20°43.3′N 57°04.4′E (1 ♀), Wahiba Sands 22 km S Al Qabil 22°22.6′N 58°38.7′E (2 ♂). **SAUDI ARABIA**: Wadi Majarish below Taif (1 ♀, KMG). **TUNISIA**: 10 km SE Tataouine at 32°51′N 10°30′E (1 ♂, CSE). **YEMEN**: Sanaa (1 ♀; 3 ♀, 1 ♂, RMNH).

Tachysphex iaphetes Pulawski, sp. nov.

Figures 183, 188.

DERIVATION OF NAME.— *Iaphetes*, Greek for archer; with reference to Archer's Post, Kenya, where the holotype was collected, a place established in 1909 by the District Commissioner Geoffrey Archer, subsequently Governor General of Sudan.

RECOGNITION.— The female of *iaphetes* is characterized by a unique foretarsal rake and a unique pygidial plate: the rake spines (except basal and apical ones) are shorter than the basitarsus width, and the apical spine is slightly shorter than tarsomere II (Fig. 188c); the pygidial plate is narrowly ovoid, rounded apically, and near the apex densely punctate and densely setose (Fig. 188d).

DESCRIPTION (based on holotype only).— Mandible: outer ridge somewhat swollen and expanded over notch. Scutal and mesopleural punctures well defined, averaging several diameters apart on scutal disk and at center of mesopleuron; interspaces unsculptured, shiny. Propodeal dor-

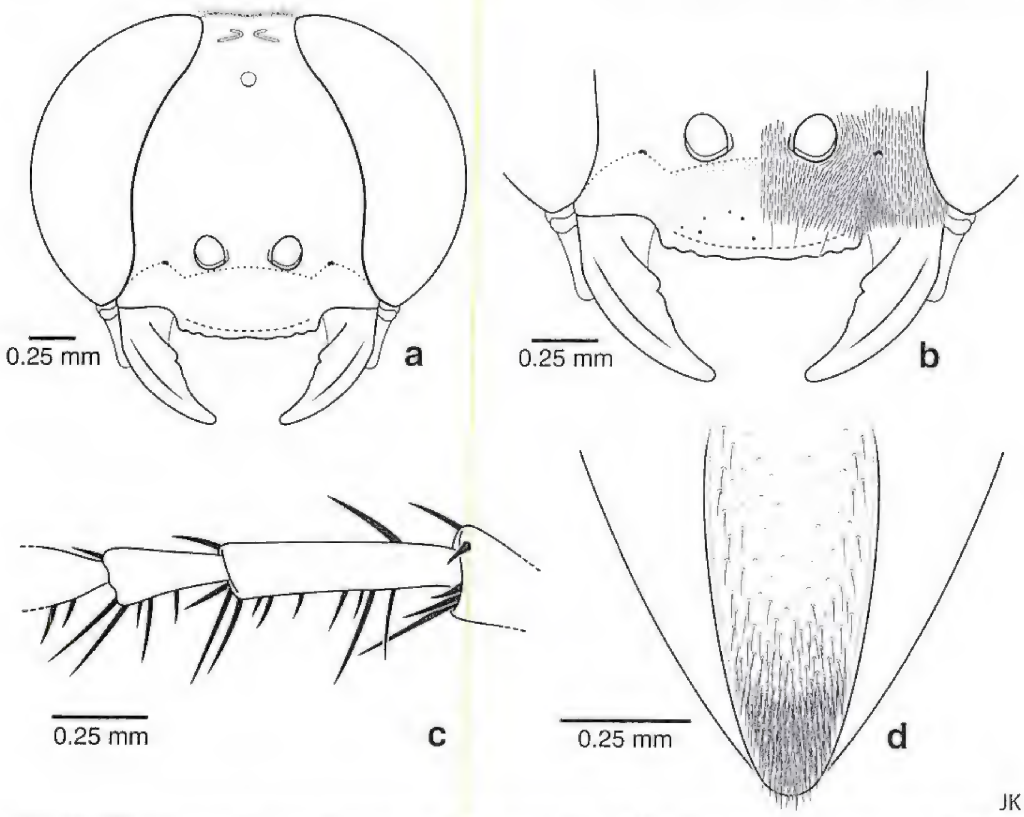

FIGURE 188. *Tachysphex iaphetes* Pulawski, sp. nov., female: a – head in frontal view; b – clypeus and mandible; c – forebasitarsus and tarsomere II; d – pygidial plate.

sum rugose and with irregular, longitudinal ridges; side ridged (ridges somewhat ill-developed at center). Hindcoxal dorsum carinate, carina slightly prominent basally.

Setae: erect on postocellar area, about as long as midocellar diameter (Fig. 188a), suberect on scutum anteriorly; nearly erect on each side of oral fossa next to occipital carina, almost as long as midocellar diameter; lacking on wide, median area on propodeal dorsum (probably due to abrasion), diverging anterad from asetose area; suberect on midfemoral venter (longest setae slightly exceed midocellar diameter).

Head, thorax, legs, and gaster black except mandible reddish preapically and apical tarsomeres brownish. Frontal setae silvery in female. Wing membrane slightly yellowish; costal vein of forewing yellowish brown, subcostal vein brown. Terga I–III silvery fasciate apically.

♀.— Head transverse in frontal view (Fig. 188a). Clypeus (Fig. 188b): bevel about as long as basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.0 × length (Fig. 188a). Dorsal length of flagellomere I 1.6 × apical width. Dorsal foretibial surface with a few, inconspicous bristles; outer surface with four bristles. Forebasitarsus with nine rake spines, a few of which (near basitarsus midlength) are shorter than basitarsus width; length of apical spine about 0.8 × tarsomere II; the latter about 2.0 × as long as wide apically (Fig. 188c). Hindtarsomere IV about as long as apically wide. Apical tarsomeres without spines on venter or lateral margins, apicoventral margin convex. Claws elongate, outer claw in each pair minimally shorter and thinner than inner claw (opposite on foretarsus), inner claw more than twice

length of arolium. Apical depression of tergum V impunctate, glabrous. Pygidial plate narrowly ovoid, rounded apically, with punctures sparse mesally except less than one diameter apart on apical one fifth or so, where the integument is also densely setose (Fig. 188d). Length 7.1 mm.

♂.— Unknown.

GEOGRAPHIC DISTRIBUTION (Fig. 183).— Kenya.

RECORDS.— HOLOTYPE: ♀, **KENYA: Rift Valley Province**: Archer's Post, 30 Nov 1982, T.L. and R.T. Griswold (CAS).

***Tachysphex ibi* Pulawski, sp. nov.**

Figures 189, 190.

DERIVATION OF NAME.— *Ibi*, beautiful in the San (= Bushman) language.

RECOGNITION.— *Tachysphex ibi*, an endemic of South Africa, has a black gaster, flat labrum, galea slightly longer than wide in profile, the setae erect on the postocellar area (about as long as the midocellar diameter), the propodeal dorsum finely, irregularly rugose, with setae erect or slightly inclined posterad (a small apicomedian area is glabrous), and the propodeal side ridged.

The female can be recognized, in addition to the above characters, by the femoral sculpture: the forefemoral venter (except apical third or so) and posteroventral midfemoral surface have well-defined punctures that are many diameters apart and aciculate interspaces. In addition, the tarsi are not modified, i.e., length of each tarsomere II is more than twice apical width, length of each tarsomere IV more than apical width, and tarsomeres V have no spines on the venter or lateral margins. Unlike *limatus*, the gena is uniformly, finely and closely punctate, the clypeal lip is not prominent mesally, and flagellomeres III–X are at least twice as wide as long, without specialized sensory areas.

In the male, the following combination is diagnostic: posteroventral midfemoral surface sparsely punctate (punctures many diameters apart); forefemoral notch extending far onto posterior surface, with a narrow (almost crest-like), elevated, platform; foretarsus without rake; clypeal lip obtusely pointed mesally (free margin shallowly concave on each side of the midpoint), lip corners closer to each other than to adjacent orbit; and sterna III–VI with suberect setae that are about one midocellar diameter long.

DESCRIPTION.— Galea longer than wide in profile, about as long as 0.7 of scape. Scutum with well-defined punctures that average about 1–2 diameters apart in male and some females, 2–3 diameters apart in other females, and also with fine, longitudinal ridges adjacent to posterior margin. Mesopleural punctures averaging about 2–3 diameters beneath scrobe, interspaces shiny to dull. Propodeal dorsum finely, irregularly rugose, partly with irregular, longitudinal ridges; side with well-defined ridges. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area and on each side of oral fossa next to occipital carina (setal length about equal to midocellar diameter), suberect on scutum (no longer than midocellar diameter), erect or slightly inclined posterad on propodeal dorsum (except small apicomedian area glabrous).

Head, thorax, and gaster black, mandible reddish at about two thirds of length. Frontal setae silvery in female, golden in male. Wing membrane moderately infumate; costal vein of forewing light brown, subcostal vein brown. Femora black; color of tibiae and tarsi: see below. Terga I–III silvery fasciate apically.

♀.— Labrum free margin straight or minimally emarginate mesally. Mandibular cleft wide open (Fig. 189a). Clypeus (Fig. 189a): bevel longer than basomedian area; lip free margin arcuate, in most specimens with two lateral incisions on each side, but with only a small, lateral sinuosity in some. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 2.0–2.2 × api-

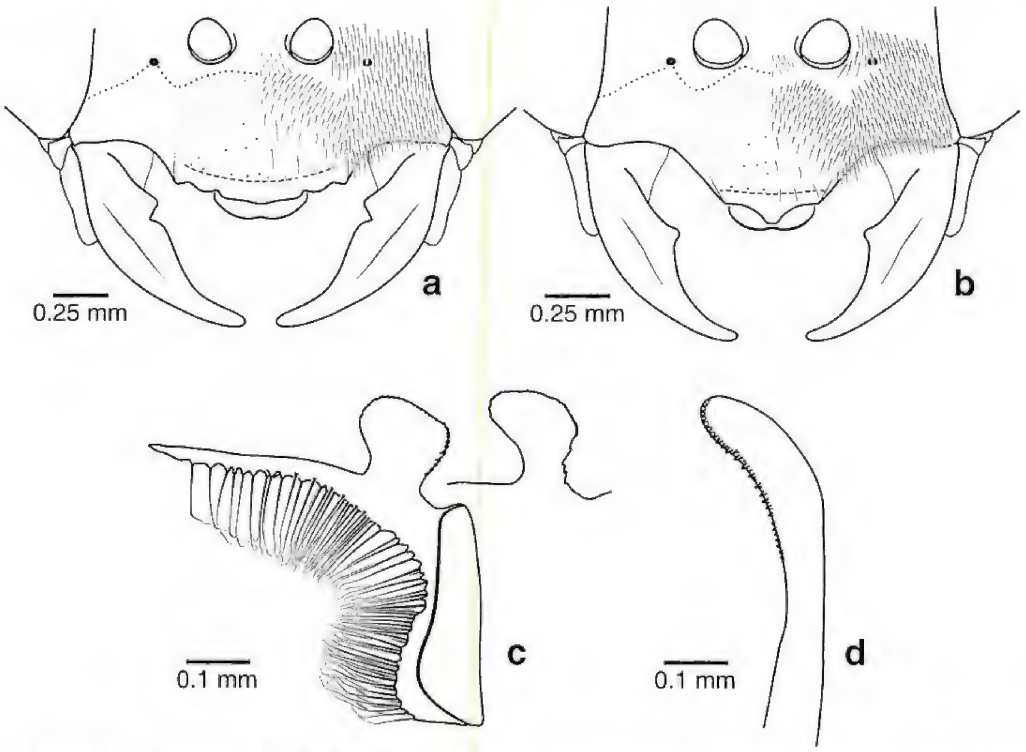

FIGURE 189. *Tachysphex ibi* Pulawski, sp. nov.: a – female clypeus; b – male clypeus and mandible; c – volsella with outline showing individual variation; d – penis valve.

cal width; length of flagellomere VIII about 2.0 × width. Forefemoral venter (except apical third or so) and midfemoral posteroventral surface with well-defined punctures that are many diameters apart; interspaces aciculate. Dorsal foretibial surface with two spines; outer surface with one or two spines, with punctures sparser than on remaining surface. Forebasitarsus with 9–12 rake spines. Midtrochanteral venter shiny, almost unsculptured, with a few, sparse, well-defined punctures. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with well-defined punctures that average many diameters apart (a few punctures adjacent to margin less than one diameter apart); interspaces aciculate. Length 9.8–10.4 mm. Tibiae black except inner foretibial surface red; foretarsus red, mid- and hindtarsi black basally, reddish apically.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 189b) with small, oblique carina emerging from each lip corner; bevel as long as basomedian area or longer; lip free margin obtusely pointed mesally (shallowly concave on each side of midpoint), with obtuse, somewhat ill-defined corner; distance between corners about 0.7 × distance between corner and orbit. Width of postocellar area 0.6–0.8 × length. Dorsal length of flagellomere I 1.6–1.8 × apical width. Forefemoral notch extending far onto posterior surface, with microscopically setose bottom and narrow (almost crest-like), elevated platform near anterior femoral surface. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Posteroventral midfemoral surface sparsely punctate (punctures many diameters apart). Sternal punctures well defined, relatively large; apical depression of sternum II and sterna III–VII with suberect setae that are about one midocellar diameter long. Length 7.4–9.5 mm. Volsella and

penis valve: Figs. 189c, d. Flagellum all black in most specimens, but flagellomeres V–X yellowish brown ventrally in some. Tibiae all red (except hindtibia darkened ventrally) or mid- and hindtibiae all black; tarsi red or hindtarsus black basally.

GEOGRAPHIC DISTRIBUTION (Fig. 190).— South Africa.

RECORDS.— HOLOTYPE: ♀, **SOUTH AFRICA: Eastern Cape Province**: Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E, 12–15 Nov 1971, F.W. Gess (AMG). PARATYPES: **SOUTH AFRICA**: **Eastern Cape Province**: Clifton Farm 18 km NW Grahamstown, 20 Nov 1990, FSG (1 ♂); Grahamstown, Jan 1979, G.L. Prinsloo (1 ♀, PPRI); Kenton-on-Sea, 15–30 Nov 1970, R.A. Jubb (2 ♀; 1 ♀, AMG); Strowan Farm 5 air km W Grahamstown, 19 Dec 1971, F.W. Gess (1 ♀, AMG). **Northern Cape Province**: W Calvinia, 12 Oct 1999, M. Halada (1 ♂); Garies, H. Townes, 27 Sept 1970 (2 ♂, AEI, CAS) and 29 Sept 1970 (1 ♀, AEI); 10 km E Kamieskroon, 17 Oct 1977, R. Miller (1 ♂, PMA); SW Loeriesfontein, 13 Oct 1999, Marek Halada (1 ♂, OÖLM); Skuinshoogte Pass near Niewoudtville at 31°16′S 19°08′E, 23–30 Sept 1994, FSG (1 ♂; 2 ♂, AMG). **Western Cape Province**: Cape Peninsula, Sept 1920, R.E. Turner (1 ♂, BMNH); Little (=Klein) Karoo SE Groot River, 25 Oct 1999, M. Halada (1 ♂, OÖLM); Rust en Vrede in Oudtshoorn District, Oct 1951, [South African] Mus. Expedit. (1 ♂, SAM); Uniondale District, Oct 1952, [South African] Mus. Expedit. (1 ♂, SAM).

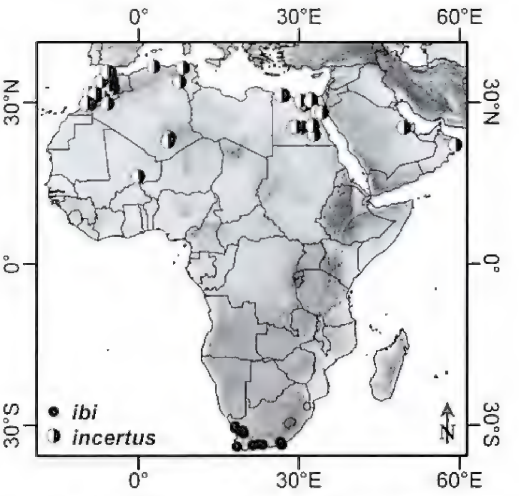

FIGURE 190. Collecting localities of *Tachysphex ibi* and *incertus* (African and Arabian localities only).

Tachysphex incanus de Beaumont

Figures 183, 191.

Tachysphex incanus de Beaumont, 1940:173, ♀, ♂. Lectotype: ♀, Mauritania: Mederdra (MNHN), **here designated**, examined (type locality erroneously placed in southern Algeria in the original description, corrected to Mauritania by de Beaumont, 1947a:192).— de Beaumont, 1947a:192 (in revision of Egyptian *Tachysphex*); Pulawski, 1971:372 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed).

RECOGNITION.— The southern Saharan *incanus* is one of the species in which the galea is membranous and not sclerotized, the maxillary stipes has short, inconspicuous setae, the frons is not bulging near the midlength, the mesopleuron is dull, with shallow, inconspicuous punctures, the hindwing vein cu-a is vertical, and the length of the marginal cell is more than 3.0 × width. Additionally, the mesopleural setae are dense and abundant, completely concealing integument in fresh specimens, and the gaster and femora are all or largely red. In the female, the pygidial plate is unusually broad, widely rounded apically, and with a shallow, transverse sulcus or impression near the midlength, and the preapical setae of sterna IV and V are somewhat thickened. In the male, sterna III–VII are sparsely punctate and essentially glabrous.

The female of *incanus* has the clypeal bevel shorter than the basomedian area, the free margin of the clypeal lip obtusely protruding mesally (Fig. 191a), and reflective setae of the hindfemoral outer surface concealing the integument along the ventral margin. Almost identical is *argentatus*, which differs in having the free margin of the clypeal lip either evenly arcuate or with a small, obtuse point, and the cleft of the trimmal carina narrow. In *incanus*, the point of the clypeal lip is

slightly larger and the cleft of the trimmal carina is broader (compare Figs. 27a and 191a). *Tachysphex curvipes* is similar, but in *incanus* the pygidial plate is clearly divided by a transverse impression, unsculptured anterad of impression and contrastingly microsculptured posterad of it. In *curvipes*, the entire pygidial plate is unsculptured.

The male of *incanus* has the clypeal free margin with a conspicuou, narrow projection mesally, and a deep forefemoral notch (about 0.3 × forefemoral diameter in posterior view). The forefemur is less curved than in *curvipes* (compare Figs. 109d and 191c) and its notch has a well-defined platform with a few, inconspicuous setae (platform ill defined in *curvipes* and *desertorum*, glabrous in *curvipes*, with minute but conspicuous erect setae in *desertorum*).

Description.— Mandible: outer ridge somewhat swollen and expanded over notch. Galea membranous. Supraantennal swelling covered by vestiture. Scutal punctures less than one diameter apart or a few punctures more than one diameter apart. Mesopleuron dull, with shallow, inconspicuous punctures that are no more than 1 diameter apart. Punctures of mesothoracic venter, anterior-

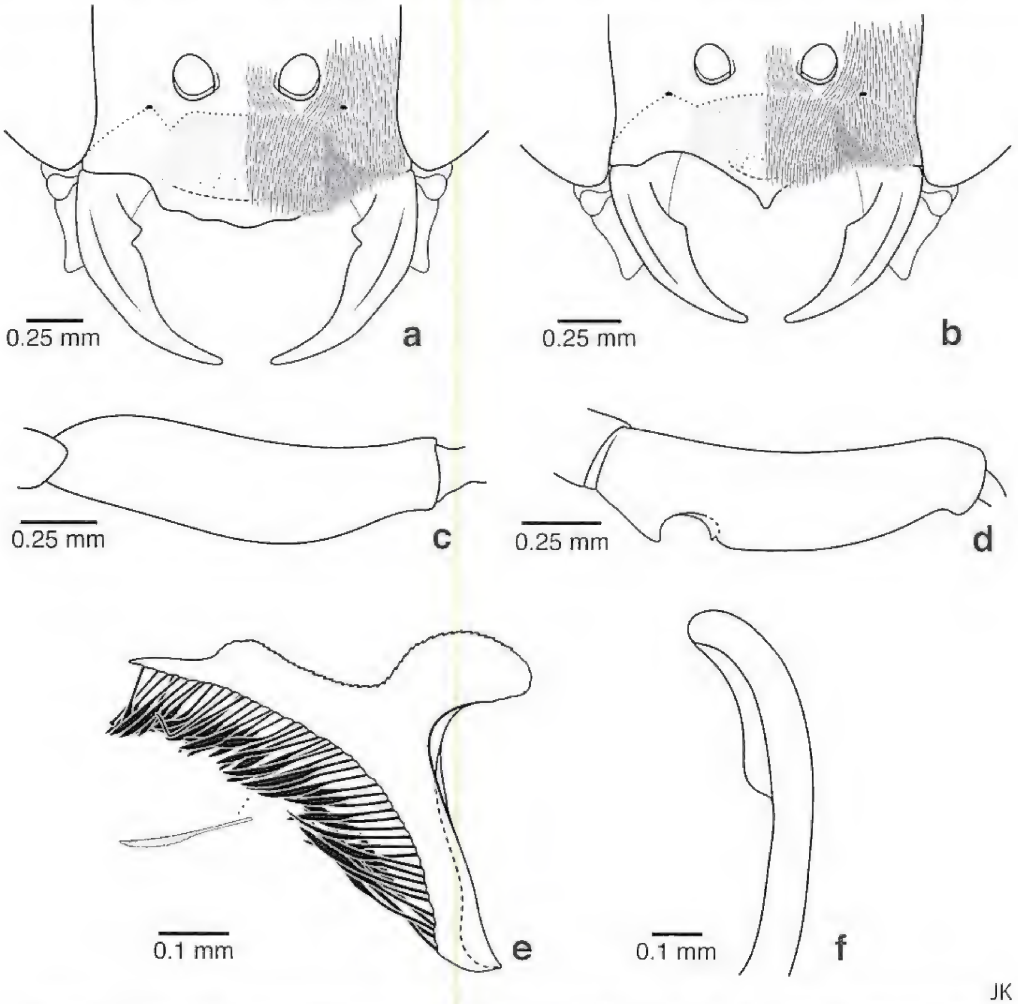

Figure 191. *Tachysphex incanus* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – male forefemur in dorsal view; d – male forefemur in posterior view showing notch; e – volsella; f – penis valve.

ly of each coxa, with punctures that are up to 2–3 diameters apart in female and up to several diameters apart in male. Propodeal dorsum evenly microsculptured (also with longitudinal ridges in some specimens); side finely ridged (unridged in one male). Hindcoxal dorsum with inner margin obtusely carinate basally.

Setae appressed on postocellar area and scutum, concealing supraantennal swelling, in fresh specimens largely concealing integument on scutum and fully so on mesopleuron; appressed and concealing integument on most of gena, except in female suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; on propodeal dorsum diverging obliquely anterad from midline, oriented laterad on remaining surface; on outer surface of female hindfemur conspicuous, reflective along ventral margin. Propodeal side all setose, sternum I all or largely glabrous.

Head and thorax black, mandible yellowish red mesally, clypeal lip reddish brown. Frontal setae silvery in both sexes. Wing membrane nearly hyaline; costal and subcostal veins of forewing reddish brown. Femora, tibiae, and tarsi red except forefemur black basally (midfemoral dorsum dark in one male). Gaster red or segments IV–VII black in male. Terga I–IV silvery fasciate apically.

♀.— Mandible: trimmal carina with broad cleft (Fig. 191a). Clypeus (Fig. 191a): bevel shorter than basomedian area; lip free margin arcuate, obtusely pointed mesally, not incised laterally. Width of postocellar area 0.5–0.6 × length. Dorsal length of flagellomere I 3.0–3.2 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two or three spines. Forebasitarsus with seven rake spines. Midtrochanteral venter shiny, unsculptured except for a few, sparse punctures. Apical spines of hindtarsomere IV exceeding claw bases. Most punctures of tergum V several to many diameters apart, apical depression impunctate, glabrous. Pygidial plate unusually broad, broadly rounded apically; with transverse sulcus which corresponds to ridge on internal surface, unsculptured anterad of ridge, longitudinally microridged posterad of ridge. Preapical setae (bordering apical depressions) of sterna IV and V thickened, although less so than in *julliani*. Length 10.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 191b): bevel absent (dense punctation extending to lip base); lip free margin pointed mesally, with ill-defined, obtuse corner in one specimens, without corner in other (here forming single curved line with rest of clypeal margin); distance between corners 3.0 × distance between corner and orbit. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 2.0–2.1 × apical width. Forefemur curved in dorsal view, but less so than in *curvipes* (compare Figs. 109d and 191c); forefemoral notch deep, about 0.3 × femoral diameter in posterior view (Fig. 191d), its bottom with well-defined platform and a few, inconspicuous setae. Outer margin of forebasitarsus with six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Venter of tarsomeres V with one subbasal and one subapical spine. Tergum VI with punctures that are several diameters apart near base and less than one diameter near apex. Apical depression of sternum II and sterna III–VII (except III laterally) with a few, sparse punctures, practically glabrous. Length 7.0–8.8 mm. Volsella and penis valve: Figs. 191e, f.

Geographic distribution (Fig. 183).— Mauritania, Senegal, Niger. The single male recorded from Libya (de Beaumont, 1947a, a paralectotype of *incanus*) is probably *argentatus*, as suggested by that author's description of the clypeus.

Records.— MAURITANIA: Mederdra (1 ♀, MNHN, lectotype of *incanus*). **NIGER**: Dungass at 13°04′S 9°20′E (1 ♂; 1 ♀, 1 ♂, MNHN). **SENEGAL**: Ndangane 45 air km SE Mbour (1 ♀; 1 ♀, FB; 1 ♂, MSNT).

***Tachysphex incertus* (Radoszkowski)**
Figures 190, 192.

[N.B. There are more than 140 literature citations of *Tachysphex incertus* and its synonyms subsequent to the original descriptions, mostly locality records from Europe. Most have been omitted, and only the essential nomenclatural data are provided. Previous revisionary studies are by de Beaumont (1936a:193, 1947a:163, as *pygidialis*) and Pulawski (1971:318).]

Tachytes panzeri varietas *geniculata* A. Costa, 1867a:87, sex not indicated, junior secondary homonym of *Tachysphex geniculatus* (Spinola, 1839), not examined. Holotype or syntypes: Italy: may be Napoli area, or Sicilia, or Sardegna (NAPOLI). Synonymized with *Tachysphex pygidialis* by de Beaumont, 1936c:7.

Tachytes panzeri varietas *geniculata* A. Costa, 1867b:31. Objective synonym of *Tachytes panzeri* varietas *geniculata* A. Costa, 1867a.

Tachytes incertus Radoszkowski, 1877:28, ♀, ♂ (as *incerta*, incorrect original termination). Lectotype: ♀, Uzbekistan: Kyzil-Kum Desert: no specific locality (ZMMU), designated by Pulawski, 1971:321, examined before 1971.— As *Tachysphex incertus*: Kohl, 1885:395 (tentative new combination); F. Morawitz, 1893:410 (new combination).

Tachysphex pygidialis Kohl, 1883a:176, ♀, ♂. Lectotype: ♀, France: Marseille (NHMW), designated by Pulawski, 1971:321, examined before 1971. Synonymized with *Tachysphex incertus* by F. Morawitz, 1893:410 and Gussakovskij, 1952:240, synonymy confirmed by Pulawski, 1971:321.

Tachysphex nattereri Kohl, 1888a:144, ♀, ♂ (as *Nattereri*, incorrect original capitalization; ♂ = *Tachysphex palopterus*). Lectotype: ♀, Sudan according to original description but labeled Egypt: no specific locality, **here designated**, examined. **New synonymy**.— As *Tachysphex pygidialis nattereri*: de Beaumont, 1947c:663 (new status).— As *Tachysphex incertus nattereri*: Pulawski, 1964:84 (Egypt), 1971:323 (in revision of Palearctic *Tachysphex*).

Tachysphex rufiventralis Ferton, 1905:68, ♀. Holotype: ♀, France: Corse: Bonifacio (MNHN), not examined. **New synonymy**.— As *Tachysphex pygidialis* var. *rufiventralis*: Guiglia, 1938:9 (new status, Italy: Sardegna).— As *Tachysphex pygidialis rufiventralis*: de Beaumont, 1947c:663 (new status, redescription).— As *Tachysphex incertus rufiventralis*: Pulawski, 1971:322 (in revision of Palearctic *Tachysphex*).

Tachysphex incertus kallipygus Pulawski, 1971:323, ♀, ♂. Holotype: ♀, Algeria: Arba (LAUSANNE), examined before 1971. **New synonymy**.

As *Tachysphex pygidialis* ssp. *algira*: de Beaumont, 1947c:664, corrected to *Tachysphex incertus kallipygus* by Pulawski, 1971:323.

Recognition.— *Tachysphex incertus* is one of the species in which the labrum is convex and conspicuously protruding beyond the clypeal free margin and the galea is longer than wide in profile (length equal to 0.75–1.2 of scape). Also, the scutal punctures are less than one diameter apart, the propodeal dorsum is all setose (setae oriented posterad at least apicomesally), the genal setae are straight and no longer than midocellar diameter, and terga I–III or I–IV are silvery fasciate. The species occurs in Africa south to Mali and southern Egypt and also in southern Europe and central and southwestern Asia.

In addition to the above, the female of *incertus* is characterized by an impunctate, glabrous apical depression of tergum V (Fig. 192c) except depression setose mesally in some specimens, a well-defined lateral incision on each side of the clypeal lip (Fig. 102a), although the incision may be worn off in old specimens, and is ill defined in some Iranian specimens, and the pygidial plate not downcurved apically. Females of *dissimulatus* and *excavatus* are nearly identical morphologically, but only *excavatus* may overlap with *incertus* in the southern Sahara (*dissimulatus* is a southern African species). Also, the pygidial plate of many *incertus* is broader than in the other two species (Fig. 192c). Females of *incertus* from Egypt and Niger have an all red gaster, and some females from northwest Africa (as well as some from Europe and Asia) have the propodeal side ridged along the dorsal and posterior margin. The propodeal side is not ridged in *dissimulatus* and *excavatus*, and the gastral apex is black in most *excavatus* and many *dissimulatus*.

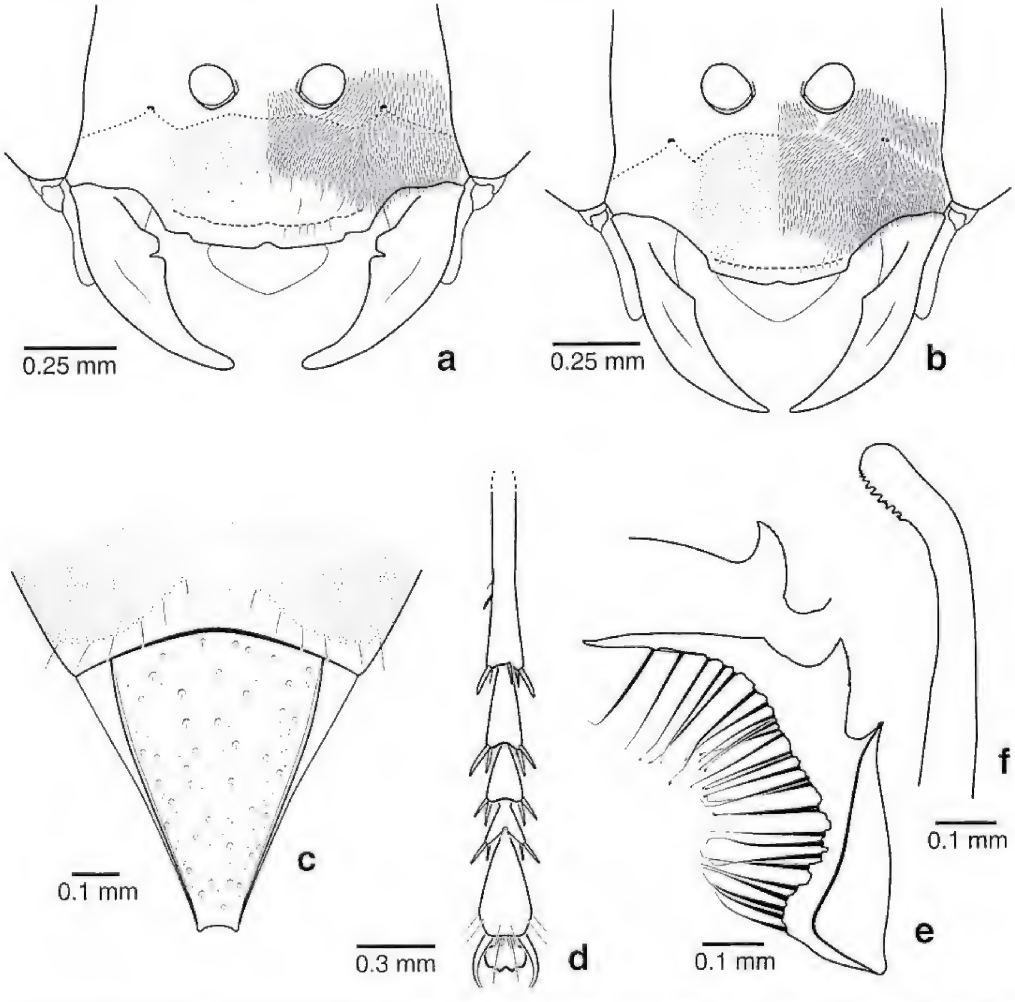

FIGURE 192. *Tachysphex incertus* (Radoszkowski): a – female clypeus and mandible; b – male clypeus and mandible; c – female terga V and VI; d – male foretarsus (the longer spine near basitarsus midlength originates at the ventral surface); e – volsella with outline showing variation; f – penis valve.

The male differs from most *Tachysphex* in having a pointed dorsal volsellar process (Fig. 192e); it also has a reduced foretarsal rake: the apical spine of foretarsomere II is mostly shorter than the tarsomere's width (equal to width in some specimens), markedly shorter than tarsomere III (Fig. 192d), and the forebasitarsus in many specimens has no preapical spines (but up to four in some). The other African species treated here whose males have a reduced foretarsal rake are: *aemulus* (in which most setae of the propodeal dorsum are oriented anterad), *brinckerae* (in which the propodeal dorsum is asetose at least apicomesally), *gracilicornis* (in which the silvery tergal fasciae are ill defined or absent), and *sahelensis* (in which the dorsal length of flagellomere II is 1.1–1.3 × apical width rather than 1.6–2.6 ×). They also differ in having the dorsal volsellar process rounded apically. The only other *Tachysphex* with a sharply pointed volsellar process are *pseudopanzeri* de Beaumont (northwest Africa, Iberian Peninsula, southern France), in which the foretarsal rake is well developed, and *sericans* (see next paragraph). The male foretarsus is also

reduced in *persa* Gussakovskij (southwest Asia, North Africa), in which the dorsal volsellar process is rounded, not pointed.

Similar to *incertus* are also *sericans* Gussakovskij (Algeria to Lower Egypt, Cyprus and Syria to Tajikistan) and the female of *persa* Gussakovskij (Balkan Peninsula, Turkey, Lower Egypt to Kazakhstan and Tajikistan). In *sericans*, however, the middle clypeal lobe is shorter than in *incertus*, resulting in a shallower free margin of the clypeus lateral section (see Figs. 280 and 281 in Pulawski, 1971). There are no reliable characters to distinguish the females of *incertus* and *persa* (the male of the latter has an apically rounded dorsal volsellar process), and association with topotypical males may be the ultimate criterion. The following may help in recognition: in the female of *incertus*, the clypeal lip has a well-defined lateral incision, at least in fresh specimens (incision evanescent in some *persa*), the propodeal side is ridged above in many specimens (not ridged in *persa*), the densely micropunctate and setose tergum V sharply contrasts with the impunctate and asetose apical depression (tergum V sparsely punctate anterad of apical depression in some *persa*), pygidial plate is mostly wider than in that species (Fig. 192c), the gaster is mostly red basally and black apically but all red in specimens from Corsica, Sardinia, Egypt, and Niger (also red and black in most *persa*, but all black in specimens from Israel and Syria).

Justification of new synonymy.— Pulawski (1971) recognized four subspecies of *incertus* (*incertus incertus*, *incertus kallipygus* from northern Algeria, *incertus nattereri* from Egypt, and *incertus rufiventralis* from Sardinia and Corsica). I am convinced now that these geographic forms are linked by intermediates that cannot be clearly assigned to one or another subspecies. For example, only *incertus rufiventralis* was supposed to occur in Sardinia, but Negrisolo and Pagliano (1993) found the nominotypical subspecies on that island. *Tachysphex incertus kallipygus* was recognized for Algerian females with a prominent lateral carina of the pygidial plate. This characters, however, appears to be correlated with the specimens' large size and thus individually variable. I expect *incertus nattereri* to be linked by intermediates to the nominotypical form. Also, a number of additional geographic forms could be raised to subspecies level to fully cover geographic variation, an action that would result in an unnecessary proliferation of names. I therefore synonymize the previously recognized subspecific names under *incertus*.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea closely punctate posteriorly, longer than wide in profile, as long as 0.75–1.0 of scape in female, 1.0–1.2 in male. Scutal punctures less than one diameter apart. Mesopleuron dull, almost uniformly microsculptured, with shallow, ill-defined punctures. Episternal sulcus incomplete in most specimens, but complete in some. Propodeal dorsum evenly microareolate; side not ridged or with ridges along dorsal and posterior margin. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; appressed to erect and about as long as one midocellar diameter on each side of oral fossa next to occipital carina; oriented posterad on propodeal dorsum at least apicomesally.

Head and thorax black in most specimens, but clypeal bevel yellowish red in many males from Egypt, and clypeus, thorax, gaster, and legs red in specimens from Haft Tapeh, Iran (male terga largely darkened); thorax largely red in some males from Morocco; mandible red or reddish mesally (largely red in specimens from Haft Tapeh). Frontal setae silvery in female and smallest males, golden in most males. Wing membrane slightly infumate; costal vein of forewing light brown or reddish, subcostal vein dark brown. Femora and tibiae varying from all black to all red (at least inner foretibial surface red or reddish basally in most females and in males); gaster red basally and black apically in many specimens, but all red in females from certain areas and all black in many males (see Variation below for details). Terga I–III or I–V silvery fasciate apically.

♀.— Clypeus (Fig. 192a): bevel as long as basomedian area or longer; lip free margin arcuate,

emarginate mesally, with well-defined lateral incision on each side (incision ill defined in some females from Iran). Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 2.3–3.0 × apical width. Dorsal foretibial surface with two or three spines; outer surface with one to four spines. Forebasitarsus with 7–9 rake spines. Apical depression of tergum V impunctate and glabrous (punctate and setose mesally in some specimens, including Egyptian females), contrasting with remaining tergum. Pygidial plate, in most specimens, broader than in other species with convex labrum (Fig. 192c), with punctures several to many diameters apart, although many punctures may be about one diameter apart adjacent to lateral margin; interspaces unsculptured. Length 7.9–13.2 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 192b): bevel as long as basomedian area or longer; lip free margin straight to minimally arcuate in most specimens but concave in smallest specimens, with obtuse but well-defined corner; distance between corners 1.0–1.3 × distance between corner and orbit. Width of postocellar area 0.5–0.8 × length. Dorsal length of flagellomere I 1.6–2.6 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines in most specimens, with one or two spines in some, and with four such spines in a male collected 3 km W Luxor, Egypt. Outer apical spine of foretarsomere II less than this tarsomere's width in most specimens (but equal to width in some), markedly shorter than tarsomere III (Fig. 192d). Length 6.4–10.0 mm. Volsella and penis valve: Figs. 192e, f.

VARIATION.— Propodeal side. The propodeal side is ridged at least along the dorsal margin in many specimens from Europe, Morocco, Algeria, northwestern Egypt (Marsa Matruh area), and Asia, but ridges are lacking in some individuals from these areas (those from Haft Tapeh, Iran, among others), particularly in males. The propodeal side is not ridged in populations from Sardinia, Corsica, and Egypt.

Male clypeus. Distance between clypeal lobe corners is 1.2–1.3 × distance between a corner and the adjacent orbit in most specimens, but 1.0–1.1 in Egyptian males.

Setae of propodeal dorsum. Setae are oriented posterad at least apicomesally (basomedian setae oriented posteromesad to anteromesad), but all setae oriented posterad along midline in some Egyptian and Tunisian males.

Number of tergal fasciae. A silvery fascia is present on terga I–III in most specimens, but also on tergum IV in females from Egypt (except for Marsa Matruh area).

Color of femora. The femora are black in most populations, but the hindfemur is partly red in females from Sardinia, Corsica, some from Cyprus, all red in females from Egypt (except for Marsa Matruh area), and also in some Egyptian and Moroccan males (female fore- and midfemora are mostly red in some Egyptian females, darkened only dorsally). All femora are red in specimens from Haft Tapeh, Iran.

Color of gaster. In most specimens the gaster is red basally and black apically (red are segments I–III in female, I and II or I–III in male). The entire gaster is red in most females from Sardinia and Corsica, those from Egypt except for Marsa Matruh area, and from Haft Tapeh, Iran. The gaster is all black in some Italian males and some from Ghiza and Kom Osheim, Egypt.

NESTING BEHAVIOR.— Ferton (1905), almost certainly in error, recorded a hemipteron *Hysteropterum grylloides* Fabricius as prey of *incertus*. According to Deleurance (1946), the nesting behavior of *incertus* is the same as of *panzeri* that he described earlier in the same paper, i.e., the female preys upon nymphal acridids and subsequently carries them to the nest in a series of hopping flights; and she paralyzes her prey with one sting in the coxopleural articulation. Kazenas (2001) found a unicellular nest, 5 cm long, that contained 2 acridid prey.

GEOGRAPHIC DISTRIBUTION (Fig. 190).— Europe north to southern France, northern Italy, Hungary, Slovakia, central Ukraine (Gorobchishin, 1994), and southern Russia; Africa south to

southern Egypt and Mali; Asia including Arabian Peninsula north to Turkey and northern Kazakhstan, east to Pakistan. Schneid's (1941) record from Bavaria, Germany, was a misidentification of *obscuripennis* (Schenck) (Schmidt and Schmid-Egger, 1997; Weber, 1998).

Records (only the African, Arabian, and previously unknown Pakistani localities are recorded here; see Pulawski, 1971, and subsequent faunal papers for records from Europe and Palearctic Asia; literature data predating de Beaumont, 1947a, are not included as reliable recognition features were not known. The localities below are from Pulawski, 1971, if not indicated otherwise).— **ALGERIA**: Hammam Lif, Idjef Melène (1 ♂) and Tamanrasset in Hoggar Mts. (de Beaumont, 1952), L'Arba, Sidi Ferruch. **EGYPT**: **Al-Bahr-al-Ahmar**: Al Quseir (1 ♂, CSE). **Al Buhayrah**: Wadi Natrun: Bir Hooker. **Al Fayyum**: Karanis (6 ♂; 2 ♂, MSNT), Kom Osheim (3 ♀, 41 ♂). **Al Ismailiyah**: Ismailia. **Al Jizah** (= Ghiza): Abu Rawash (12 ♂; 1 ♂, AMNH), Dahshur (1 ♀), Ghiza (8 ♀, 13 ♂), Saqqara (1 ♂). **Al Qahirah** (= Cairo): Maadi (1 ♀, 4 ♂). **Al-Uqsur** (= Luxor): 3 km W Luxor (1 ♀, 43 ♂; 2 ♂, SAM, 1 ♀, SCHL). **Al-Wadi al-Jadid**: Dakhla oasis: Mut (1 ♂, ZMAN) and 5–10 km E Tineida, Kharga oasis: El Kharga. **As Suways** (= Suez): Fayed (2 ♂), Wadi Hagul (1 ♂, MSNT). **Aswan**: Aswan, west bank (1 ♂). **Matruh**: 20–25 km W Marsa Matruh (1 ♀), 64 km W Marsa Matruh (1 ♀, MSNT). **Sina** (= Sinai): 15 km NW Tor (1 ♂), Wadi Malhaq 50 km N Sharm el Sheikh (3 ♂). **MALI**: Tilemsi valley N Gao (1 ♂, KMG). **MOROCCO** (from de Beaumont, 1955, or as indicated): Agadir (1 ♂, ZMAN), Asni in High Atlas (1 ♂), Assaka, Beni Mellal (1 ♀), Casablanca (1 ♀, SCHL), Douet-Aoua (Pulawski, 1971), El Moudzine (Pulawski, 1971), Fès (1 ♀), Kenitra (1 ♂, SCHL), Marrakech (1 ♂), Mdiq (1 ♀), Meknès (1 ♂), Mhamid 80 km S Zagora in Draa Valley (2 ♂), Midelt, Oued Adoudou, Rabat (Pulawski, 1971), 10 km S Oued Ain Leuh which is 33°21′N 5°32′W (1 ♂, CSE), Smir Bestinga (Pulawski, 1971), Tafraout, Tanger (1 ♂, SCHL), Tiznit at Oued Massa 30 km S Zagora in Draa Valley (4 ♂, CSE). **NIGER**: **Tillabéri Region**: 2 km SE Kollo at 13°19.6′N 2°19.9′E (1 ♀), 8 km SE Kollo at 13°16.4′N 2°22.0′E (1 ♀). **OMAN**: **Northern Oman**: Al Wafi (Guichard, 1980). **PAKISTAN**: **Baluchistan**: Hazarganji Chiltan National Park 20 km SW Quetta (2 ♂). **SAUDI ARABIA**: Hofuf (1 ♂, KMG). **TUNISIA**: Ain Soltan 40 km W Jendouba (1 ♂), 15 km W Nefta at 33°50′N 7°43′E (4 ♂ CSE).

Tachysphex inextricabilis Pulawski

Figures 193, 194.

As *Tachysphex luxuriosus* (♂ only), corrected to *Tachysphex inextricabilis* by Pulawski, 1971:353: de Beaumont, 1940:167 (in revision of Egyptian *Tachysphex*), 1947a:353 (in revision of Egyptian *Tachysphex*); Pulawski, 1964:93 (Egypt).

As *Tachysphex seth* (♀ only): Pulawski, 1964:92, corrected to *Tachysphex inextricabilis* by Pulawski, 1971:353.

Tachysphex inextricabilis Pulawski, 1971:353, ♀, ♂. Holotype: ♂, Egypt: Kom Osheim on Cairo-Fayum road (CAS).— de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Bohart and Menke, 1976:274 (listed).

Recognition.— *Tachysphex inextricabilis* is similar to *luxuriosus*. See that species for differences (p. 393).

Nomenclatural history.— Morice described *luxuriosus* from the female only. De Beaumont (1940, 1947) associated the male and described another species, *horus*, from both sexes. Pulawski (1964) followed de Beaumont's interpretation of *luxuriosus*, noticed that the female of *horus* was not the same species as the male, and described the latter as *seth*. He subsequently (1971) recognized that the male of *seth* (including the holotype) was conspecific with the female of *luxuriosus* and synonymized these two names. He also recognized that his female of *seth* was the same species as de Beaumont's male of *luxuriosus* and that the species had no name. He called it *inextricabilis*.

Description.— Labrum convex, conspicuously protruding beyond clypeal free margin. Galea: punctures about one diameter apart (several diameters apart apically in single male from

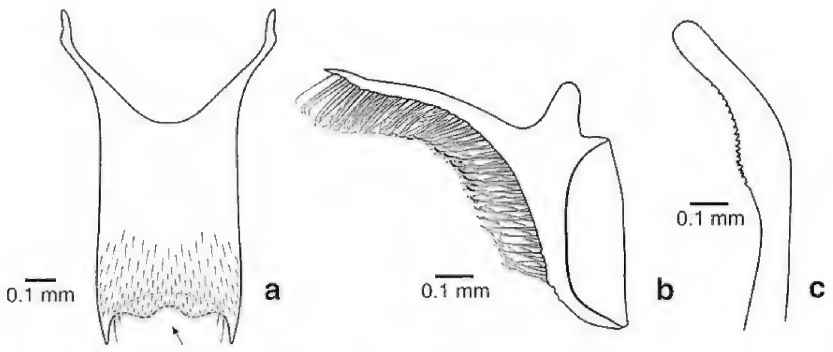

FIGURE 193. *Tachysphex inextricabilis* Pulawski: a – male sternum VIII; b – volsella; c – penis valve.

Saudi Arabia); as long as scape in female, 1.2–1.3 of scape in male. Supraantennal swelling nearly all setose. Scutal hindcorner roundly prominent, scutal flange broadening posterad (as in Fig. 219a); scutal punctures well defined, about one diameter apart in female and single male from Saudi Arabia, up to about two diameters apart in other males. Mesopleuron coriaceous, dull. Propodeal dorsum microsculptured, dull, longitudinally ridged to reticulate; side with fine, ill-defined ridges. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area, scutum, and mesopleuron, fully concealing integument of frons, scutum, and mesopleuron in fresh females; subappressed to erect (and then equal to 0.4 of basal mandibular width) on each side of oral fossa next to occipital carina; variously oriented on propodeal dorsum; propodeal side setose throughout. Sternum I at least partly glabrous except all setose in Saudi specimen.

Head and thorax black except the following yellowish red: clypeal bevel and lip, labrum, mandible (except apically), and female scapal venter (all or largely so). Frontal setae silvery in both sexes. Wing membrane hyaline; costal and subcostal veins of forewing reddish. Femora black (except apically) or mid- and hindfemora largely red (black basally). Gaster red or segments III–V all or partly black (segments III–VII all black in a male from Kom Osheim, Egypt). Terga I–IV in female, I–V in male, silvery fasciate apically (also following tergum with some silvery setae).

♀.— Mandible: cleft unusually broad, widely open (as in Fig. 161c). Clypeus (as in Fig. 161c): bevel about as long as basomedian area; lip free margin practically straight, roundly emarginate laterally; bevel delimited anterolaterally by inconspicuous carina that emerges from lip corner. Width of postocellar area 2.1–2.2 × length. Dorsal length of flagellomere I 2.6–2.8 × apical width. Forefemoral base, on anteroventral surface, with a few large punctures that are many diameters apart. Dorsal foretibial surface with three or four spines; outer surface with two spines. Forebasitarsus with eight or nine rake spines. Midtrochanteral venter unsculptured except for a few, sparse punctures. Venters of tarsomeres V each with thin, preapical spine. Apical depression of tergum V partly impunctate and glabrous. Gastral segment VI flattened, pygidial plate relatively broad, with minute punctures that average many diameters apart, interspaces unsculptured. Length 10.7–11.6 mm.

♂.— Mandible: trimmal carina obtusely angulate, but without tooth or cleft. Clypeus (as in Fig. 161d): bevel about as long as basomedian area; lip free margin evenly, inconspicuously arcuate; corner obtuse, ill defined; distance between corners about 1.2 × distance between corner and orbit. Width of postocellar area 2.0–2.2 × length. Dorsal length of flagellomere I 1.9–2.5 × apical width. Forefemur not emarginate. Outer margin of forebasitarsus with 2–5 rake spines (numbers of spines may differ on right and left leg); outer apical spine of foretarsomere II slightly shorter to slightly

longer than tarsomere III. Venters of tarsomeres V each with thin, preapical spine. Sternum VIII: bottom of apical emargination with minute incision mesally (Fig. 193a). Length 7.9–10.0 mm. Volsella and penis valve: Figs. 193b, c.

COLLECTING PERIOD.— 12 February (Saudi Arabia), 2 April through 22 July.

GEOGRAPHIC DISTRIBUTION (Fig. 194).— Egypt, Israel, Syria, and Saudi Arabia.

RECORDS.— **EGYPT**: **Al Fayyum**: Kom Osheim (3 ♀, 14 ♂). **Sina** (= Sinai): Wadi Malhaq 50 km N Sharm el Sheikh (2 ♂, CAS, MSNT). **ISRAEL**: Jericho, Revivim, Wadi Audja 10 km N Jericho (Pulawski, 1971), Wadi N'Aqev 5 km SSE Sede Boqer (1 ♂, CSE). **SAUDI ARABIA**: Wadi Majarish below Taif (1 ♂, KMG). **SYRIA**: Damascus-Kissue Road (1 ♂).

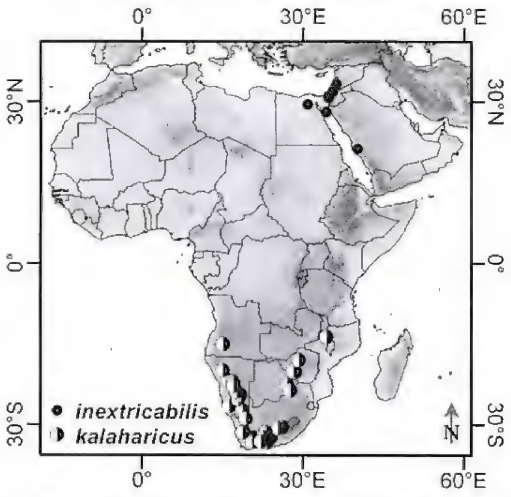

FIGURE 194. Collecting localities of *Tachysphex inextricabilis* and *kalaharicus*.

Tachysphex insulsus Arnold

Figures 195–197.

Tachysphex insulsus Arnold, 1945:104, ♀, ♂. Lectotype: ♀, Madagascar: Bekily (MNHN), **here designated**, examined.— Bohart and Menke, 1976:274 (listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Tachysphex crassicornis Arnold, 1945:105, ♀, ♂. Lectotype: ♀, Madagascar: Bekily (MNHN), **here designated**, examined. **New synonym.**— Bohart and Menke, 1976:273 (listed); Leclercq, 1990:117 (Madagascar); Pulawski, 2003:797 (in checklist of Malagasy Sphecidae).

RECOGNITION.— *Tachysphex insulsus*, an endemic of Madagascar, differs from that island's congeners in having the following combination: gaster red; labrum flat, not or barely projecting from beneath the clypeus; setae of postocellar area appressed; propodeal dorsum evenly microareolate, with setae (or at least most setae) oriented obliquely anterad; female forefemur minutely punctate, evenly setose, pygidial plate in most specimens with punctures averaging several diameters apart (exceptionally punctatorugose, as in *bara*); and male sternal setae inconspicuous, appressed.

JUSTIFICATION OF NEW SYNONYMY.— Extreme specimens of *insulsus* are so different that at least two species appear to be involved at first (e.g., individuals from Isalo, or the type series of *crassicornis* and of *insulsus*). Additional material, however, demonstrates considerable variation and full intergradation of all characters (see Variation below for details). Consequently, I regard *crassicornis* and *insulsus* as conspecific.

DESCRIPTION.— Scutal punctures about one diameter apart. Mesopleural punctures minute, shallow, mostly ill defined, but well defined in specimens from Sakaraha area, two females from Ifaty, and one from Berenty; interspaces microsculptured. Propodeal dorsum evenly microareolate; side with dense, evanescent ridges, or minutely punctate, or evenly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed, or nearly so, on postocellar area and scutum; erect on each side of oral fossa next to occipital carina; oriented anterad on propodeal dorsum (except posterolateral and apical setae, in many specimens, oriented posteromesad).

Head and thorax black, mandible red mesally. Frontal setae silvery in both sexes except gold-

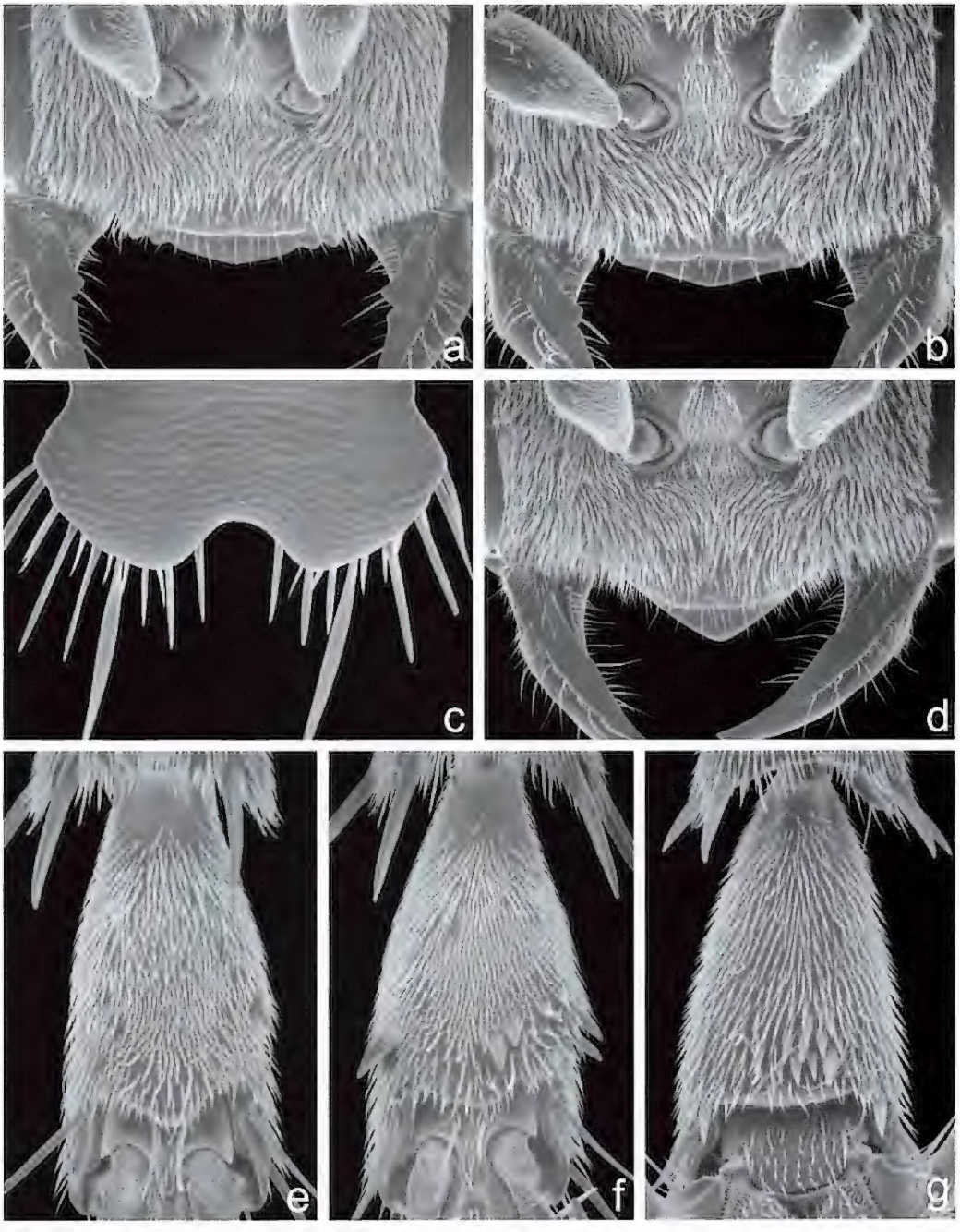

FIGURE 195. *Tachysphex insulsus* Arnold: a – female clypeus (×45); b – male clypeus with lip obtusely pointed (×57); c – female labrum (×108); d – male clypeus and mandible with clypeal lip prominently pointed (×54); e – female hindtarsomere V in ventral view, spines absent (×120); f – female hindtarsomere V in ventral view, spines present (×150); g – male hindtarsomere V in ventral view (×240).

en in both specimens from Ankarafantsika National Park (weakly so in female). Wing membrane slightly infumate, nearly hyaline; forewing costal and subcostal veins brown (mostly subcostal vein light brown and subcostal vein dark brown, but both veins light brown or dark brown in some specimens). Color of legs: see Variation below. Gaster all red in most females and some males, but gastral tip becoming gradually black in some females (one from Isalo, another from Beza Mahafaly) and segments IV–VII or V–VII black in most males. Terga I–III or I–IV silvery fasciate apically, but fasciae golden and inconspicuous in some females.

♀.— Labrum entire or emarginate (Fig. 195c). Clypeus (Fig. 195a): bevel as long mesally as basomedian area or longer; lip free margin arcuate, mostly with two lateral incisions on each side, but with only one indentation in one of the smallest specimens studied. Width of postocellar area 0.8–1.3 × length. Dorsal length of flagellomere I 1.5–2.5 × apical width. Forefemur minutely punctate, ventral punctures several to many diameters apart. Dorsal foretibial surface with one to four spines; outer surface with several (mostly thin) spines. Forebasitarsus with 10–14 rake spines. Tarsomeres IV as wide as long; dorsoapical emargination rounded basally; apicoventral margin minimally emarginate. Tarsomeres V elongate, not angulate basoventrally; venter with erect microsetae (see Variation below for spines and apicoventral margin). Punctures of tergum V varying from about 1–2 to several diameters apart, apical depression impunctate, glabrous. Pygidial plate in most specimens punctate, with punctures averaging several diameters apart, some punctures nearly contiguous, and interspaces practically unsculptured; punctatorugose in single female from Ankarafantsika National Park. Length 7.0–11.1 mm.

♂.— Mandible: trimmal carina simple or with small tooth and cleft. Clypeus (Figs. 195b, d): bevel about as long mesally as basomedian area; lip varying from arcuate to pointed, with obtuse but well-defined corner; distance between corners equal to 1.0–1.4 distance between corner and orbit. Width of postocellar area 0.9–1.3 × length. Dorsal length of flagellomere I 1.3–1.8 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Sternum VIII: hindmargin sinuate mesally. Length 5.9–7.9 mm. Volsella and penis valve: Fig. 196.

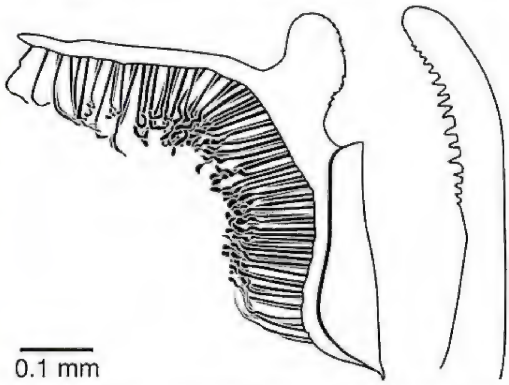

FIGURE 196. *Tachysphex insulsus* Arnold: volsella and penis valve.

VARIATION.— Variation in *insulsus* affects characters that in other species are constant and may be diagnostic (such as the shape of the labrum, the shape of female apical tarsomeres, and their spines). None of the observed differences is geographic, but some appear to result from allometric growth. Some of the variation is included in the Description above, and the most conspicuous aspects are discussed below.

Female labrum. The labrum is deeply, narrowly emarginate (Fig. 195c) in some females (e.g., the lectotype of *insulsus* and a female from Isalo), but shallowly, broadly emarginate in others; shallowly concave mesally in the females from Sakaraha and the one from Zombitsy Forest; and not emarginate in those collected near Toliara, in one from Beza Mahafaly, two of the three from Tsimbazaza, and two of the four from Isalo.

Female postocellar area. The narrowest postocellar area (width to length ratio of 0.8) was found in the largest specimen examined (11.1 mm long), the lectotype of *insulsus*. The widest postocellar

area (ratio 1.3) was found in a small specimen, 8.5 mm long.

Female flagellomere I: dorsal length 1.5–2.2 apical width in most specimens, but 2.5 × in the lectotype of *insulsus*.

Female tarsomeres V: apicoventral margin. The apicoventral margin is arcuate in many specimens, nearly straight in one from Ifaty, and triangularly projecting in some (including the lectotype of *insulsus*).

Female tarsomeres V: spines. Typically, the apical tarsomeres have one preapical ventral spine and also one spine on each lateral margin (near the midlength). Some females from Beza Mahafaly, however, have two preapical spines, and none is present in the lectotype of *insulsus* and a female from Isalo (Figs. 195e, f); the lateral spines are absent in a female from Beza Mahafaly and three from Ifaty, and evanescent on the inner side in the same female from Isalo (on the outer side on the foretarsus). In another female from Beza Mahafaly, there are two lateral spines on the midtarsomere's inner side, and the female from Sakaraha area has two spines on the outer side of hindtarsomere V, but none on the inner side.

Male clypeal lip. The lip free margin is arcuate in most specimens (Fig. 195b), obtusely angulate in some, and conspicuously pointed in two males collected 12 km SW of Toliara (Fig. 195d). Several males from Beza Mahafaly approach the latter condition.

Male mandible: trimmal carina. The carina has a tooth in most specimens, but is edentate in the males with a pointed clypeal lip.

Male postocellar area. As in the female, the narrowest postocellar area (length 0.9 × apical width) was found in the largest specimen examined, the widest postocellar area (ratio 1.3) in one of the smallest ones.

Male apical tarsomeres. Mostly with one small, preapical spine on venter, but with two or three spines (Fig. 195g) or none in some specimens.

Leg color. Femora I and II black (except red apically in most specimens), hindfemur and tibiae varying from all red (most specimens) to all black. Intermediate situations include the following: 1. hindfemur red basally, black in apical third; 2. foretibia largely black; midtibia, hindfemur, and hindtibia red; tarsi dark brown; 3. fore- and midtibiae largely black; hindfemur and hindtibia red; tarsi dark brown; 4. legs all black except hindfemur and hindtibia red; and, 5. legs all black except hindtibial dorsum largely red.

Prey.— One female from Bekily (MNHN) is pinned with a minute gryllid nymph, presumably her prey.

Geographic distribution (Fig. 197).— Madagascar.

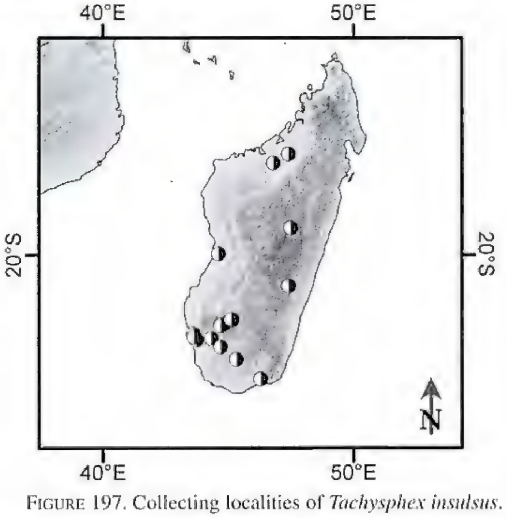

FIGURE 197. Collecting localities of *Tachysphex insulsus*.

Records.— **MADAGASCAR: Antananarivo**: Tsimbazaza Park (1 ♀; 2 ♀, KU). **Fianarantsoa**: Forêt d'Analalava 29.6 km W Ranohira at 22°35′30″S 45°07′42″E (1 ♂), Isalo National Park at 22°36′S 45°10′E (2 ♀), Ranomafana (3 ♂, MNHN). **Mahajanga**: Forêt d'Ambohimanga at 15°57′46″S 47°26′17″E (2 ♂), Parc National d'Ankarafantsika: Ampijoroa Station Forestière 40 km NW Andranofasika at 16°19′15″S 46°48′38″E (1 ♀, 1 ♂). **Toliara**: Antanimora (Arnold, 1945), Bekily (1 ♀, 2 ♂, MNHN, including lectotype ♀ and paralectotype ♂ of *insulsus*; 2 ♀, 1 ♂, MNHN, lectotype and paralectotypes of *crassicornis*), Berenty (1 ♀, KU), 22 km N Betioky (1 ♀), Beza Mahafaly (5 ♀, 3 ♂; 24 ♀, 11 ♂,

KU), Ifaty 22 km N Toliara at 23°11′S 43°37′E (2 ♀; 1 ♀, MSNT), 50 km NE Morondava (1 ♀, 1 ♂, MRAC), Parc National de Zombitsy at 22°50′36″S 44°42′36″E (1 ♀), 38 km W Sakaraha (2 ♀, 1 ♂; 1 ♂, MSNT), 5 km N Toliara (2 ♀), 12 km SW Toliara (3 ♀, 1 ♂), Zombitsy Forest (1 ♀, BMNH).

Tachysphex isis de Beaumont

Figures 198, 199.

Tachysphex isis de Beaumont, 1940:171, ♀, ♂. Holotype: ♀, Egypt: Wadi Rishrash (originally A. Alfieri collection, Cairo, now Entomological Society of Egypt), not examined.— de Beaumont 1947a:179 (in revision of Egyptian *Tachysphex*); Pulawski, 1971:395 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed).

Recognition.— *Tachysphex isis* has hindwing crossvein cu-a oblique (the anal end is further away from the wing base than the cubital end), although only slightly so in some specimens, and sternum I without longitudinal, median carina; in addition, male sterna III–VI are impunctate and glabrous at least mesally. The same combination is found in *albocinctus* and *bruneiceps*, but unlike these species, the frons of *isis* is markedly convex (Figs. 198c, d), the setae are appressed on the postocellar area, thorax, and tergum I (fully concealing the thoracic integument in the female), the gaster is all or partly red, the foretarsomeres are not expanded apicolaterally, and the female pygidial plate is sparsely, minutely punctate. In *albocinctus* and *bruneiceps*, the frons is the usual shape (only slightly convex), the setae are erect on the postocellar area, scutum, and base of tergum I, not concealing the integument; the gaster is all black; foretarsomeres I and II are expanded apicolaterally except in some males (Figs. 15c, d); and the female pygidial plate is granulose (Figs. 15e, f).

Because of similar coloration and pilosity (the setae completely conceal the integument on the frons, postocellar area, and thorax), the female of *isis* closely resembles *osiris*. In *isis*, however, sternum I lacks the longitudinal carina (at least apically), the frons is more prominent (Fig. 198c), the propodeal side is all setose (rather than glabrous anteriorly), the outer hindfemoral surface is concealed by setae (not concealed in *osiris*), and the pygidial plate is somewhat constricted preapically (Fig. 198e), while evenly narrowing posterad in *osiris*.

Description.— Frons markedly convex (Figs. 198c, d). Scutal and mesopleural punctures fine, practically contiguous. Propodeal dorsum evenly microsculptured, side finely ridged in females, in male finely ridged or not ridged; posterior surface, in dorsal third or so, with wide median impression. Hindwing: crossvein cu-a with anal end further away from wing base than cubital end. Hindcoxal dorsum not carinate.

Setae erect on each side of oral fossa next to occipital carina (about as long as 0.4 of basal mandibular width); appressed on postocellar area and scutum; on propodeal dorsum oriented anterad near base, oriented toward midline at midlength, and oriented posterad near apex; in female entirely concealing integument of frons, postocellar area, thorax, fore- and midfemoral venters, and hindfemoral outer surface; propodeal side all setose.

Head and thorax black, mandible yellowish red except black apically. Frontal setae silvery in female, golden in male. Wing membrane hyaline in female, intensely yellowish brown in male except almost hyaline near base and along apical margin; costal vein of forewing light brown, subcostal vein brown. Forefemur black (except red apically) in female and some males, red (except basally) in other males; midfemur all red or black basally (all basal half black in female); hindfemur, tibiae and tarsi red. Gaster all red or black apically in female, red or with dark apex in male (terga with translucent apical depressions). Terga I–IV in female, I–V in male, silvery fasciate apically (fasciae golden in some males).

♀.— Labrum slightly emarginate mesally. Clypeus (Fig. 198a): bevel shorter than basomedian area; lip free margin arcuate, with rudimentary, median notch. Width of postocellar area 1.1 ×

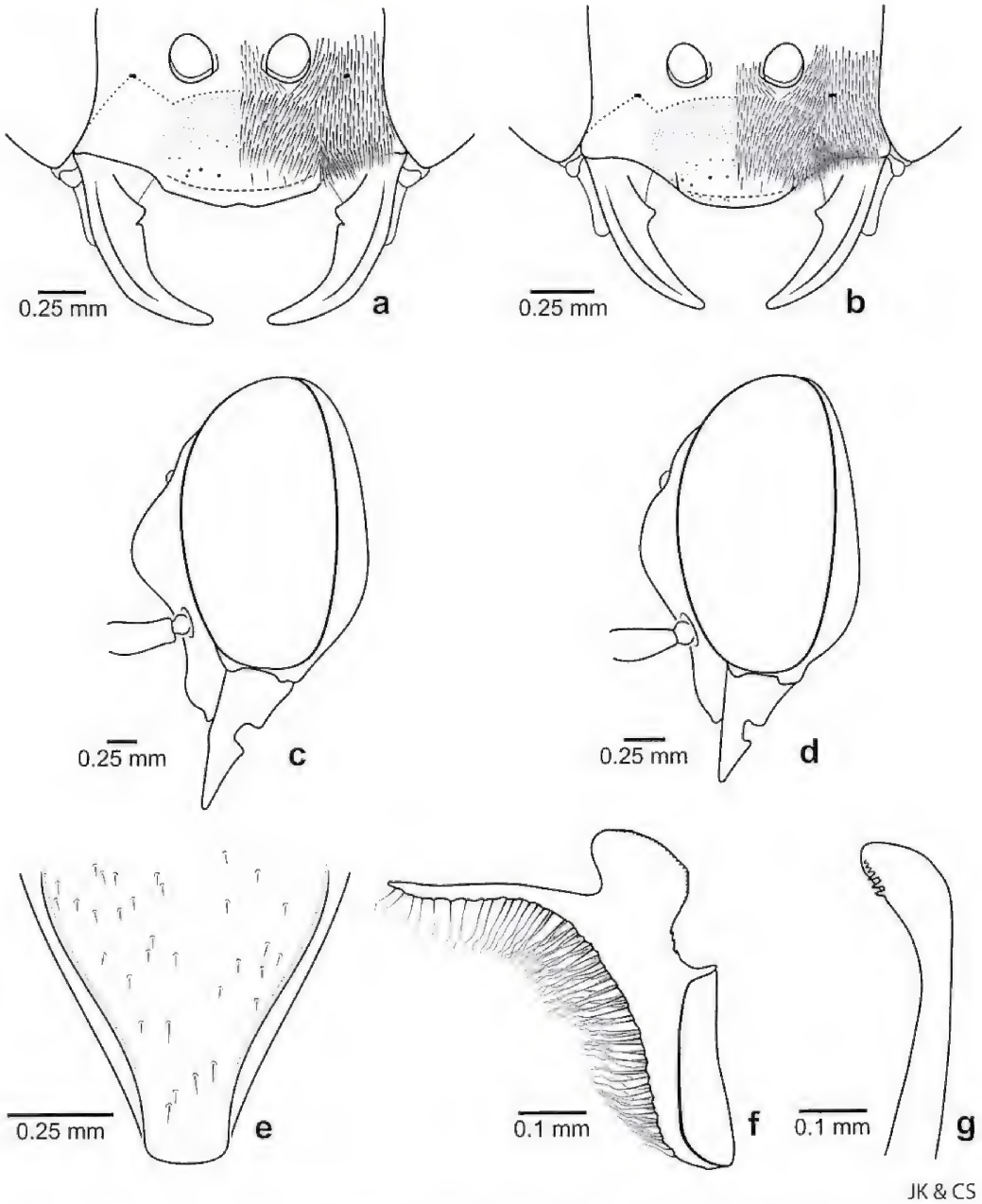

FIGURE 198. *Tachysphex isis* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – female head in lateral view; d – male head in lateral view; e – pygidial plate of female; f – volsella; g – penis valve.

length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Dorsal foretibial surface with one, thin spine; outer surface with three spines. Forebasitarsus with nine rake spines. Venter of apical tarsomeres with thin subbasal spine and preapical seta. Tergum V with minute punctures that are many diameters apart; its apical depression impunctate, glabrous. Pygidial plate constricted preapically (Fig. 198e), with punctures that average many diameters apart; interspaces unsculptured; apex rounded. Length 10.0–11.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft (Fig. 198b). Clypeus (Fig. 198b): bevel shorter than basomedian area, delimited anterolaterally by obtuse carina that emerges from lip corner; lip free margin arcuate, corner obtuse; distance between corners 1.0–1.2 × distance between corner and orbit. Width of postocellar area 0.6–0.8 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Forefemoral notch shallow, microscopically setose. Outer margin of forebasitarsus with 3–5 rake spines; outer apical spine of foretarsomere II slightly shorter to slightly longer than tarsomere III. Venters of tarsomeres V each with one thin, preapical spine. Sterna III and IV largely impunctate and glabrous mesally, sterna V and VI entirely so (but apical depressions sparsely setose in some individuals). Length 7.0–10.0 mm. Volsella and penis valve: Figs. 198f, g.

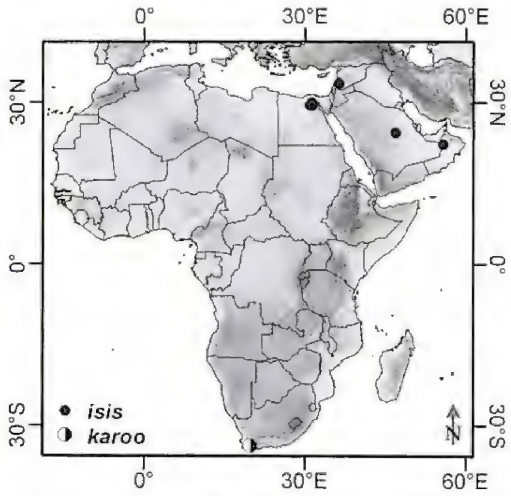

FIGURE 199. Collecting localities of *Tachysphex isis* and *karoo*.

GEOGRAPHIC DISTRIBUTION (Fig. 199).— Libya, Egypt, Syria, Saudi Arabia, Oman.

RECORDS.— EGYPT: **Al Fayyum**: Kom Osheim (as Fayum, 2 ♂, NHMW). **Al Jizah** (= Ghiza): Ghiza Pyramids (1 ♂; 4 ♂, NHMW). **Al Qahirah** (= Cairo): Wadi Digla (1 ♂; 1 ♀, 1 ♂, NHMW; 1 ♂, SAM), Wadi el Tih (1 ♀, 1 ♂; 12 ♂, NHMW), Wadi Hof (1 ♀, 1 ♂, NHMW), Wadi Rishrash (de Beaumont, 1940). **LIBYA**: **Cyrenaica**: no specific locality (de Beaumont, 1940). **OMAN**: 22°15′N 55°45′E (1 ♀, BMNH). **SAUDI ARABIA**: Al Ha'ir (1 ♂, KMG). **SYRIA**: Ramadan near Damascus (Pulawski, 1971).

Tachysphex julliani Kohl

Figures 200, 201.

Tachysphex julliani Kohl, 1883a:177, ♂, ♀ (as *Julliani*, incorrect original capitalization). Lectotype: ♀, France: Marseille (NHMW), designated by Dollfuss, 1979:13, examined.— Kohl, 1885:384 (in revision of Larrini); Dalla Torre, 1897:680 (in catalog of world Hymenoptera); Ferton, 1897:111 (prey), 1901a:100 (nesting habits), 1901b:680 (France); Antiga and Bofill, 1904:11 (in catalog of Catalonian Hymenoptera); de Gaulle, 1908:121 (in catalog of French Hymenoptera); Mercet, 1910:165 (listed from Spain); Morice, 1911:102 (Algeria); Ferton, 1912a:402 (structural and behavioral characters); Adlerz, 1916:109 (mantid prey reported); Berland, 1923a:174 (prey), 1923b:288 (France); Ferton, 1923:127 (prey); Berland, 1924:90 (France), 1925:120 (in Sphecid Fauna of France); Grandi, 1930:341 (Italy); Berland, 1932:23 (France); Bernard, 1933:62 (France); Giner Marí, 1934:133 (Spain); Bernard, 1935:65 (France); de Beaumont, 1936a:199 (in revision of French *Tachysphex*), 1940:172 (in revision of Egyptian *Tachysphex*; specimens may actually be *argentatus*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae, specimens may actually be *argentatus*); Giner Marí, 1943:141 (in Sphecid Fauna of Spain); de Beaumont, 1947a:188 (in revision of Egyptian *Tachysphex*; specimens may actually be *Tachysphex argentatus*), 1947b:391 (Cyprus); de Andrade, 1949:16 (Portugal); Pittioni, 1950:25 (Cyprus); de Beaumont, 1954a:56 (Italy), 1954b:91 (Italy),

1955a:182 (Moroccan forms); Ceballos, 1956:376 (in catalog of Spanish Hymenoptera); de Beaumont, 1956a:197 (Libya); Nouvel and Ribaut, 1958:13 (France); de Beaumont, 1959:27 (Italy); Diniz, 1959:29 (Portugal); Suárez, 1959:57 (Spain); de Beaumont, 1960a:18 (Greece: Island of Rhodes), 1960b:238 (Libya), 1961a:50 (Greece: Crete Island), 1962b:25 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Diniz, 1964:5 (Portugal); nec Pulawski, 1964:95 (= *Tachysphex argentatus*); de Beaumont, 1965:48 (Greece); Pulawski, 1967:398 (Turkey); Königsmann, 1971:106 (Spain); Pulawski, 1971:360 (in revision of Palearctic *Tachysphex*); Kazenas, 1972:162 (Kazakhstan); Myartseva, 1972a:79 (Turkmenistan); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Bohart and Menke, 1976:274 (listed); Georghiou, 1977:192 (Cyprus); Kazenas, 1978:117, 128 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:216, 220 (in key to Sphecidae of European USSR); Guichard, 1980:227 (Oman); Pagliano, 1980:128 (Italy); Gayubo, 1984a:85 (Spain), 1984b:365 (Portugal); Gayubo and Tormos, 1984:15 (Spain); Gayubo, 1986a:33 (Spain), 1986b:38 (Spain); Gayubo and Heras, 1986:41 (Spain); Gayubo and Sanza, 1986:46 (Spain); Gayubo and Tormos, 1986:12 (Spain); Islamov, 1986:526 (Uzbekistan); Gayubo, 1987:113 (Spain); Asís and Jiménez, 1988:272 (Spain); Gayubo and Mingo, 1988:80 (Spain); Dollfuss, 1989:13 (lectotype in NHMW); Pagliano, 1990:104 (in catalog of Italian Sphecidae); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Tormos, Asís, and Gayubo, 1994:188, 205 (Spain); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); González, Gayubo, and Torres, 1998:72, 73 (Spain); Nazarova, 1998:41 (Tajikistan); Gayubo, García, Torres, and González, 1999:89 (Spain); González, Gayubo, and Torres, 1999:355 (Spain); Gayubo, González, and Torres, 2000:185 (Spain); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia), 158 (review of known biology); Schmidt and Bitsch *in* Bitsch et al., 2001:225 (in Sphecid Fauna of Western Europe); Kazenas 2002:69 (Kazakhstan).

Tachysphex semenovi Gussakovskij, 1933:281, ♀. Lectotype: ♀, Iran: Kerman: Khunikaka (ZIN), designated by Pulawski, 1971:364, examined before 1971. Synonymized with *Tachysphex julliani* by Pulawski, 1971:360.

As *Tachysphex julliani* Kohl No. 1: de Beaumont, 1955a:182 (Morocco) and 1956a:197 (Libya), synonymized with *Tachysphex julliani africanus* by Pulawski, 1971:365.

Tachysphex julliani africanus Pulawski, 1971:365, ♀, ♂. Holotype: ♂, Morocco: Ijoukak (LAUSANNE), examined before 1971.— Bohart and Menke, 1976:274 (listed). **New synonym.**

Recognition.— *Tachysphex julliani* is one of the species that have the galea membranous, maxillary stipes with short, inconspicuous setae, frons not bulging near midlength, hindwing vein cu-a vertical, and length of marginal cell more than 3.0 × width.

In the female, in addition, the pygidial plate is broadly rounded apically, not constricted preapically, in most specimens with a transverse sulcus or at least a difference in the surface level, the integument being sparsely punctate anteriorly to the sulcus and impunctate posteriorly to it (Fig. 200c). Also, the clypeal bevel is present and the lip free margin is not incised laterally but concave in some specimens (Fig. 200a), and the setae bordering the apical depressions of segments IV and V are thickened. Unlike *mauretanus*, the female of *julliani* has the mandibular outer ridge somewhat swollen and expanded over the notch, and unlike *argentatus* the mesopleural vestiture is easily visible, not concealed by vestiture.

The male of *julliani* is characterized by the mesally glabrous sterna IV–VI (at most with a few, sparse punctures and associated setae), the clypeal free margin with a conspicuous median projection (Fig. 200b), and the mesopleural setae not concealing the integument. Unlike *argenticeps*, the mesopleuron of *julliani* is dull, with ill-defined punctures (rather than shiny, with well-defined punctures), and the apical margin of sternum VIII is evenly emarginate (tridentate in several populations of *argenticeps*). Unlike *desertorum*, the forefemoral notch of *julliani* has a well-defined platform and no erect setae. *Tachysphex argentatus* is also similar, but has a short, inconspicuous median clypeal prominence (Fig. 27b), and the mesopleural setae fully conceal the integument in fresh specimens.

JUSTIFICATION OF NEW SYNONYMY.— De Beaumont (1955a) found two phenotypes in Morocco that closely resembled *julliani*, but did not name them. Pulawski (1971) treated one as a full species (*mauretanus*), the other as a subspecies of *julliani* (*julliani africanus*). He defined the latter as having no transverse sulcus on the female pygidial plate (he studied one specimen) and a prominent, apically truncate clypeal process in the male. However, some other North African females of *julliani* that subsequently came to light have a pygidial sulcus, and some North African males have an intermediate clypeus. For these reasons I synonymize *julliani africanus* with *julliani*.

DESCRIPTION.— Mandibular outer ridge somewhat swollen and expanded over notch (except in smallest males). Galea membranous. Scutal punctures well defined. Mesopleuron dull, with ill-defined, superficial punctures, compressed against each other. Propodeal dorsum evenly microsculptured to longitudinally ridged; side ridged in most specimens, unridged in some; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; about 0.3 × length of basal mandibular width on each side of oral fossa next to occipital carina; those of propodeal dorsum oriented anterad on triangular zone (with triangle apex reaching dorsum hindmargin); oriented posterad outside triangle.

Head and thorax black, mandible reddish except in apical third or so. Frontal setae silvery in both sexes. Wing membrane nearly hyaline; costal vein of forewing light brown, subcostal vein dark brown. Femora and gaster varying from all red to all black (see Variation below); tibiae partly red in most specimens (all red in those from Cyprus), all black in some, tarsal apex red. Terga I–III silvery fasciate apically, also tergum IV in some males from Central Asia.

♀.— Clypeus (Fig. 200a): bevel slightly convex, shorter than basomedian area; lip free margin roundly protruding mesally and concave laterally in most specimens, but almost evenly arcuate in some. Width of postocellar area 0.5–0.7 × length. Dorsal length of flagellomere I 2.2–2.9 × apical width. Mesothoracic venter, in many specimens from Balkan Peninsula and Turkey, with punctures that are more than one diameter apart. Dorsal foretibial surface with three spines; outer surface with two or three spines. Forebasitarsus with eight or nine rake spines. Midtrochanteral venter at most with narrow, impunctate zone. Preapical bristles of gastral segments IV and V conspicuously thickened. Apical depression of tergum V impunctate, glabrous. Pygidial plate broadly rounded apically, with transverse ridge on internal surface (ridge in most specimens indicated externally either as sulcus or as difference in surface level), with at least a few, sparse punctures anterad of sulcus, impunctate posterad of sulcus, in many specimens with evanescent microsculpture or characteristically microridged next to apex (Fig. 200c). Length 7.8–12.3 mm.

♂.— Mandible: trimmal carina somewhat expanded or with obtuse tooth, without cleft. Clypeus (Fig. 200b): bevel shorter than basomedian area to rudimentary; lip free margin with median projection of varying length, either with well-defined corner or corner absent (then free margin forming single curved line with rest of clypeal margin); distance between corners about 0.8 × distance between corner and orbit. Width of postocellar area 0.6–0.9 × length. Dorsal length of flagellomere I 1.3–1.9 × apical width. Forefemoral notch with well-defined, microscopically setose platform that slightly raises apically over femoral surface (best seen in posterior view). Outer margin of forebasitarsus with three or four rake spines. Outer apical spine of foretarsomere II at most as long as tarsomere III. Venter of tarsomeres V with one small spine near center. Tergum VII, near base, with punctures that are one or more diameters apart. Sterna III–VI with impunctate and glabrous apical depressions, sterna IV–VI impunctate and glabrous mesally anterad of depression (at most with a few, sparse punctures), densely punctate laterally (densely punctate areas decreasing in size toward gastral apex). Length 5.0–9.0 mm. Volsella and penis valve: Figs. 200d, e.

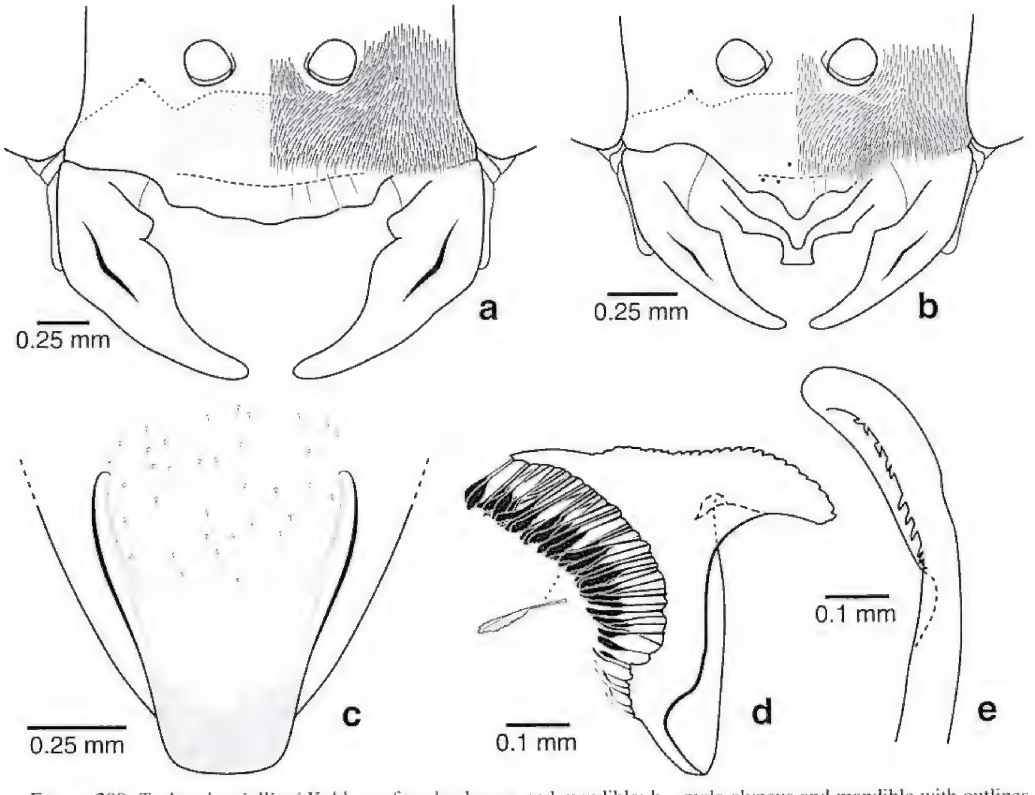

FIGURE 200. *Tachysphex julliani* Kohl: a – female clypeus and mandible; b – male clypeus and mandible with outlines showing clypeal free margin of Tajik and Moroccan specimens; c – pygidial plate of female; d – volsella; e – penis valve.

VARIATION.— Scutal punctures. About one diameter apart in most specimens, but many punctures 2–3 diameters apart in single female from Tabarka area, Tunisia, those from Turkmenistan, Tajikistan, and Pakistan, and 3–4 diameters apart or so in those from Yemen.

Male clypeus (Fig. 200b). Middle projection of the free margin rounded in most populations, but truncate (and slightly longer) in many Moroccan specimens. It is also longer than average but rounded apically in Egyptian specimens. Lip corners present in most specimens (prominent in many from Spain), but absent in those from Turkmenistan, Tajikistan, and Pakistan.

Color of gaster. Gaster red basally and black apically in most populations; predominantly black in specimens from Kazakhstan, Uzbekistan, and Tajikistan (only tergum I red posteriorly in most females); all black in specimens from Yemen, the males from Katamia and Mitla Pass, Egypt, those from Israel, and some from Spain; all red in females from Cyprus (apex brown in males) and some from Iran (holotype of *semenovi*).

Color of femora. Femora black in most populations, but part of midfemur and hindfemur red in specimens from Israel, and all femora red in those from Cyprus and some from Iran.

PREY.— Ferton (1897, 1901a) noted six mantid prey per cell in a nest. They were 4–20 mm long and at various degree of paralysis. Berland (1923a) observed a female walking with a young, paralyzed nymph of *Ameles decolor* (Charpentier).

GEOGRAPHIC DISTRIBUTION (Fig. 201).— Morocco to northern Egypt, Iberian Peninsula, southern France (excluding Corsica), central Italy, Greece and southern Bulgaria, Crimea, Turkey,

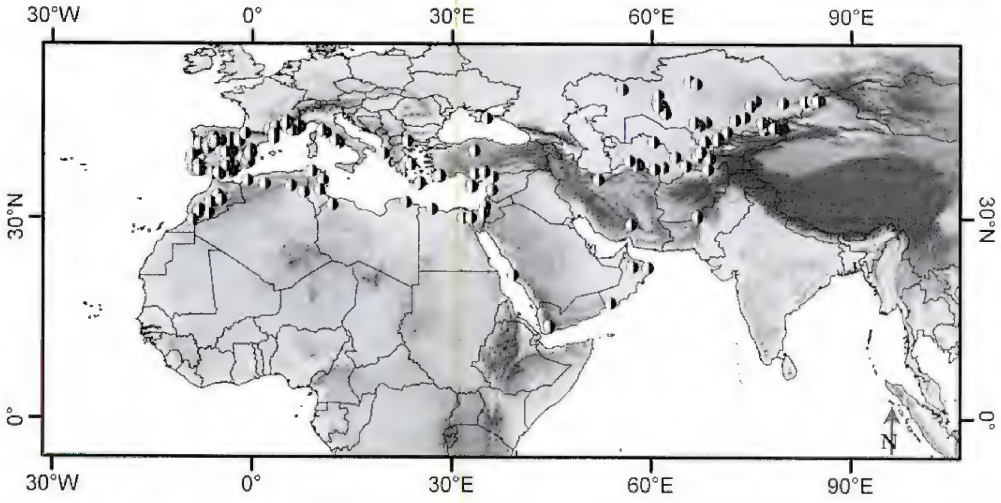

FIGURE 201. Collecting localities of *Tachysphex julliani*.

Middle East south to Oman and Yemen, east to Kazakhstan and Pakistan. De Beaumont's (1940, 1947a) records from Egypt, not confirmed by Pulawski (1971), probably refer to *argentatus*.

RECORDS (from Pulawski, 1971, if not indicated otherwise).— **ALGERIA**: Biskra (Morice, 1911), El Kala (Ferton, 1912a), Misserghin near Oran, Nemours. **BULGARIA**: Sandanski (1 ♂). **CYPRUS**: Cherkes (1♂), Kalohorio (5 ♀, 1 ♂), Limassol (1 ♀, 1♂), Mandria, Polemidia Hills (1♂), Saettas (1 ♀), Yermasoyia (3 ♀, 8 ♂), Zakaki (1 ♂). **EGYPT**: **Al Qahirah** (= Cairo): Katamia area 40 km E Maadi (1 ♂). **Matruh**: 20–25 km W Marsa Matruh (3 ♂; 2 ♂, MSNT), 25–30 km W Marsa Matruh (1 ♂; 1 ♂, MSNT). **Sina** (= Sinai): Mitla Pass (1 ♂). **FRANCE** (Berland 1923b or as indicated): **Alpes-de-la-Haute-Provence**: Lurs (Bitsch et al., 2001). **Alpes-Maritimes**: Cagnes. **Ardèche**: Saint-Sauver-de-Cruzières. **Aude**: Leucate (1 ♀). **Bouches-du-Rhône**: Marseille (syntypes of *julliani*), Miramas (Ferton, 1897). Pas-des-Lanciers (Berland, 1925), Vitrolles. **Drôme**: Dieulefit (Bernard, 1933). **Hérault**: no specific locality (Bitsch et al., 2001). **Pyrénées-Orientales**: Argelès (Pulawski, 1971), Banyuls-sur-Mer (2 ♀, 3 ♂). **Var**: Callian, Carqueiranne (Berland, 1925), Cavalaire, Fréjus (Bernard, 1935), Saint-Aygulf (Bernard, 1935), Toulon (Ferton, 1897). **Vaucluse**: Carpentras (1 ♂). **GREECE**: **Aegean Islands**: Island of Rhodes (de Beaumont, 1960a:18): Empona, Ixia, also Kolimbia (1 ♂, CSE). **Ionian Islands**: Corfou: no specific locality (1 ♀, 1 ♂). **Kriti** (= Crete): Gortys (1 ♂), Heraklion (1 ♀), Karteros (1 ♂), Knossos (2 ♂). **Pelopónnisos**: Corinth (de Beaumont, 1965). **Sterea Ellás** (= Central Greece, de Beaumont, 1965): Kifissia, Kifissos River. **IRAN**: **Elburz**: Ab Ali (1 ♂). **Kerman**: Khunikaka (Gussakovskij, 1933). **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973): Jerusalem, 15 km W Wadi Avrat = 48 km S Beersheba. Also: En Aqev near Sede Boker at 30°50.01′N 34°48.64′E (1 ♂; 2 ♂, CSE). **ITALY**: **Lazio**: Campo Ascolano (Pagliano, 1980), Circeo in Latina Province (de Beaumont, 1954b, 1959a), Tor Vajanica (Pagliano, 1980). **Toscana**: Maremma Toscana (Grandi, 1930); San Vincenzo in Livorno Province (de Beaumont, 1954a). **KAZAKHSTAN** (K = Kazenas, 1972, P = Pulawski, 1971): **Aktöbe**: Babatay near Uil (K, P), 30 km SW Yrghyz (K). **Almaty**: Arkharly Range at about 44.3°N 77.5°E (K), 18 km NE Ayak-Kalkan at about 44°N 78.5°E (K), 30 km E Chilik near Borandysu (K), Chulak Mts. at about 44°N 78°E (K), 30 km E Chundzha (K), 45 km SW Chundzha at Temerlik River (K), Kainazar near Talgar (K), Kapchagai (K), 25 km E Kapchagai (K), 5 km SW village Kazakhstan on Kurty River at about 44.5°N 76.5°E (K), Kurtagoy area on Sharyn River 130 km SW Panfilov (P), Malyie and Bolshyie Boguty Ranges (K, P), Sogety Mts. 30 km SEE Chilik (K). **Aqmola**: 6 km SE Priozernoye (K). **Eastern Kazakhstan**: 40 km W Chernyaevka NW Zaysan (K), Karabulak at about 47.5°N 85°E (K), 10–12 km S Karasu at about 47.5°N 83°E (K), 5 km SW Tansyk (K), 3 km E Ul'ken-Karatal at about 47.7°N 85°E (K), 10–13 km WNW and 15 km NE Zaisan (K). **Qaraghandy**: 50–110 km NE Balqash (K), 5–15 km SW Balqash (K), Koksenghir S Zhana Arka = Atasuskiy (P). **Qostanay**: 15 km NE Amantogai (K), 20–25 km SW

Arkalyk at about 50°N 67°E (K), 9 km NW Zhalanash (K). **Qyzylorda**: 5 km E Akespe = 80 km W Aral'sk at about 47°N 60.5°E (K), 10 km NW Aral'sk (K), 3 km NW and 10 km NNW Kamyshlybash (K), 15 km S Kazalinsk (K), village Priaral'skoye 10 km NNW Kamyshlybash (1 ♀), 3 km S Yany-Kurgan (K), Zhulek (K). **South Kazakhstan**: Novostroyevka (K), 15 km S Pervomayskoye (K), Koksu (K), Shymkent (P), 35–45 km NW Suzak (K). **Zhambyl**: Chiganak on Lake Balkhash at about 45°N 74°E (K), 70 km NW Furmanovka (K), Zhambyl (K). **LEBANON**: Becharré, Cedars (1 ♂), Kadisha (1 ♀, 3 ♂). **LIBYA**: **Cyrenaica**: Tmimi (de Beaumont, 1960b). **Tripolitania**: Giado (de Beaumont, 1956a). **MOROCCO**: Aït Saoun at 30°45′N 6°38′W (1♀, 1 ♂), Aoulouz, Asni, Azrou in Moyen Atlas (3 ♂), Beni Mellal, Ijoukak in Grand Atlas (1 ♂), Midelt (2 ♂), Tafraout. **OMAN** (Guichard, 1980): **Northern Oman**: Behla, Sur. **Dhofar**: Ayun pools. **PAKISTAN**: **Baluchistan**: Hazarganji Chiltan National Park 20 km SW Quetta (2 ♀, 4 ♂), Jalogir 23 km N Quetta (1 ♂, AMNH). **PORTUGAL**: **Beja**: Aljustrel (Diniz, 1964). **Coimbra**: Troia (Diniz, 1964). **Évora**: Évora (de Andrade, 1949). **Faro** (Gayubo, 1984b): Açoteias, Aldeia da Tor, Bensafrim, Carrapateira, Lagoa de Albufeira and Monchique (Diniz, 1964), Olhão, Paderne, Porta de Lagoa, Salir, San Bartolomeu de Messines, Santo Estevão. **Lisboa**: Seixal (Diniz, 1964). **Setúbal**: Sines and Trafaria (Diniz, 1964), Vale de Gaio (1 ♂). **Vila Real**: Porto de Rei (de Andrade, 1949), Rezende (Diniz, 1964). **SAUDI ARABIA**: S Jeddah (1 ♂, OHL). **SPAIN**: **Albacete** (Tormos, Asís, and Gayubo, 1994): Agramón, Donal, El Jardin, Puente de Torres, Yeste. **Alicante** (Torregrosa, Gayubo, Tormos, and Asís, 1993): Alicante (1 ♂), La Murada, Monnegre, Novelda, Rebolledo, San Vicente del Raspeig, Tibi. **Almería**: Alpujarras (1♂), Paterna (Suárez, 1959). **Ávila**: Navalperal (Gayubo and Mingo, 1988). **Burgos** (Gayubo and Sanza, 1986): Doña Santos, Fuentelcésped, Fuentespina, Mamolar, Vadocondes. **Cadiz**: Jerez de la Frontera (2 ♂). **Castellón de la Plana** (Gayubo and Tormos, 1986; Asís and Jiménez, 1988): Artana, Chodos, La Llosa, Onda, Segorbe, Sueras, Tales. **Ciudad Real** (Gayubo, 1987): Daimiel, Mestanza, Pozuelos, Valenzuela de Calatrava. **Cuenca:** Tarancon (2 ♂). **Gerona**: Palamós (Königsmann, 1971). **Granada**: Colinas Bermejas (Gayubo, 1986b), La Zubia (1 ♀), San Lujar, Válor. **Jaen**: Las Correderas, Martos. **Madrid** (Gayubo and Mingo, 1988): El Escorial, El Pardo, Madrid, Ribas de Jarama, Villaviciosa de Odón. **Malaga**: Marbella (de Beaumont, 1962b), Ronda. **Salamanca** (Gayubo, 1984a): Alba de Tormes, Cabeza de Caballo, Calvarrasa de Arriba, Casillas de Flores, Encina, Fuenteguinaldo, Las Arribes del Duero (Gayubo, González, and Torres, 2000), Pereña, Saldeana, Villar de Ciervo. **Segovia**: Coca at 41°13′N 4°31′W (1 ♂, SCHL), Lastras de Cuéllar (Gayubo and Heras, 1986) Maderuelo (Gayubo and Sanza, 1986). **Soria** (Gayubo, García, Torres, and González, 1999): Cigudosa, Deza. **Toledo**: Alberche (Gayubo and Mingo, 1988), Toledo (1 ♀, 3 ♂). **Valencia**: Cañada and El Plá (Giner Marí, 1934), Godelleta and Picasent (Gayubo and Mingo, 1988), Serra (Gayubo and Tormos, 1984). **Valladolid**: Viana de Cega (González, Gayubo, and Torres, 1998, 1999). **Zamora** (Gayubo, 1986a): Brime de Urz, Fresno de la Ribera, Mayalde, Olmillos de Castro, Venialbo. **Zaragoza**: Tiermas (Gayubo and Mingo, 1988). **TAJIKISTAN**: Hissar, Khodja-Obigarm ca 50 km N Duchanbe, Kondara Canyon 35 km N Dushanbe (2 ♀, 2 ♂), Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TUNISIA**: Monastir (1 ♀, CSE), 15 km W Nefta at 33°50′N 7°43′E (1 ♀, CSE), Shkira 50 km N Gabès (1 ♀, CSE), 15 km E Tabarka at 36°59′N 8°55′E (1♀). **TURKEY**: **Ankara**: Kalecik (Pulawski, 1967). **Hatay**: Antakya (2 ♂). **Mersin**: Mut, Tarsus (4 ♂). **TURKMENISTAN**: Ak Tepe (Myartseva, 1972a), Farab, Firuza 40 km W Askhabad, Geok-Tepe (Myartseva, 1972a), Germab (Myartseva, 1972a), Kara-Kala, Kerki, Mary, Tedjen (1 ♂). **UKRAINE**: **Crimea**: Karadag, Otuzy (1 ♀). **UZBEKISTAN**: **Kara-Kalpak Autonomous Republic**: Khiva. **Samarkand Oblast'**: Aman-Kutan 35 km SW Samarkand. **Tashkent Oblast'**: village Khumsan in Karzhantau Range in Tashkent Oblast' (Islamov, 1986), Kuropatkino near Tashkent. **YEMEN**: Sanaa (3 ♀; 5 ♀, ZMAN).

Tachysphex kalaharicus Arnold, new status

Figures 194, 202–204.

Tachysphex sericeus race *kalaharicus* Arnold, 1924:72, ♀. Holotype: ♀, Botswana: Palapye road (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex sericeus kalaharicus*: Bohart and Menke, 1976:276 (new status, listed).

Tachysphex scabrosus Arnold, 1929:386, ♂. Holotype: ♂, Zimbabwe: Shiloh (SAM), examined. **New synonym.**— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:276 (listed).

RECOGNITION.— *Tachysphex kalaharicus* shares the following with *subfimbriatus*: labrum flat,

not protruding or slightly protruding beyond clypeal margin; setae sinuous on lower gena, anteriorly on scutum, and on propodeal dorsum; width of postocellar area less than length; mesopleuron punctate; propodeal side ridged; hindwing crossvein cu-a vertical or nearly so. Unlike *scopa*, the female of *kalaharicus* has the setae of the midfemoral venter about as long as the midocellar diameter (rather than markedly longer), mid- and hindtarsomeres III almost twice as long as apically wide (rather then 1.2–1.3 × apical width), the dorsoapical emargination of tarsomeres IV acutely angulate (rather than roundly emarginate), the apicoventral margins of the apical tarsomeres nearly straight (rather than roundly produced), and the claws not elongate (arolium about half length of a claw rather than one third).

The female of *kalaharicus* differs from *subfimbriatus* in having the clypeal free margin shallowly notched mesally (Fig. 202c); hindtarsomeres V of most specimens with a spine on each lateral margin (Fig. 202e); and the basal platform of sternum II wedge-shaped (acutely angulate) (Fig. 202g). In *subfimbriatus*, the free margin of the clypeal lobe is evenly arcuate mesally; hindtarsomeres V have no spines on lateral margins; and basal platform of sternum II is broadly rounded (with a sharp median point in some specimens).

The male of *kalaharicus* is unique in the genus in having erect, apicomesal setal fasciae on sterna III–V that emerge from a single, transverse line (Figs. 203c-e), although fasciae are rudimentary and difficult to see in some specimens. In addition, foretarsomere I has 0–3 preapical rake spines on the outer margin, the outer apical spine of foretarsomere II is shorter than foretarsomere III (Fig. 203b), and the forefemoral notch is setose (Fig. 203a). In *subfimbriatus*, the erect apicomedian setae of sterna III–V emerge from a small, circular area (Figs. 373c, d), foretarsomere I has three or four preapical rake spines, the outer apical spine of foretarsomere II is as long as foretarsomere III, and the forefemoral notch is glabrous.

Justification of new synonymy.— I regard *scabrosus* as an individual or perhaps a geographic form of *kalaharicus* and therefore a synonym of the latter. See Variation below for details.

Description.— Scutal punctures averaging about one diameter apart, but many discal punctures 2–3 diameters apart in some specimens. Mesopleural punctures averaging less than one diameter apart in female, about one diameter in male. Mesothoracic venter in female and certain males with some punctures up to 2–3 diameters apart. Propodeal dorsum rugose and with irregular, longitudinal ridges; side ridged; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum with inner margin carinate (except apically). Sternum I, in many specimens, with obtuse carina that bisects apical depression.

Setae (figures in parentheses refer to setal length expressed as a fraction of basal mandibular width): sinuous, erect or suberect on each side of oral fossa next to occipital carina (up to 0.8); appressed on postocellar area in female, erect in male (about one midocellar diameter long); sinuous, suberect on scutum anteriorly (only some anterolateral setae in female); largely obscuring integument of female mesopleuron; sinuous, suberect, oriented posterad on propodeal dorsum except basal setae oriented anterad in female (0.8–1.0).

Head and thorax black, mandible yellowish and reddish (except apically). Frontal setae silvery in female, golden in male. Wing membrane nearly hyaline; costal vein of forewing reddish, subcostal vein dark brown. Female fore- and midfemora varying from mostly black (red apically) to all black, hindfemur all red; male femora black, red apically. Tibiae and tarsi red. Female gaster largely red, but some terga (varying from III to III–V) largely to all black. Male gaster red basally (segments I or I and II), remainder black; all gaster black in specimens from Shiloh, Zimbabwe. Terga I–IV in female, I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 202c): bevel about as long as basomedian area; lip free margin arcuate, shallowly emarginate mesally, not incised laterally. Width of postocellar area 0.6–0.7 × length (Fig.

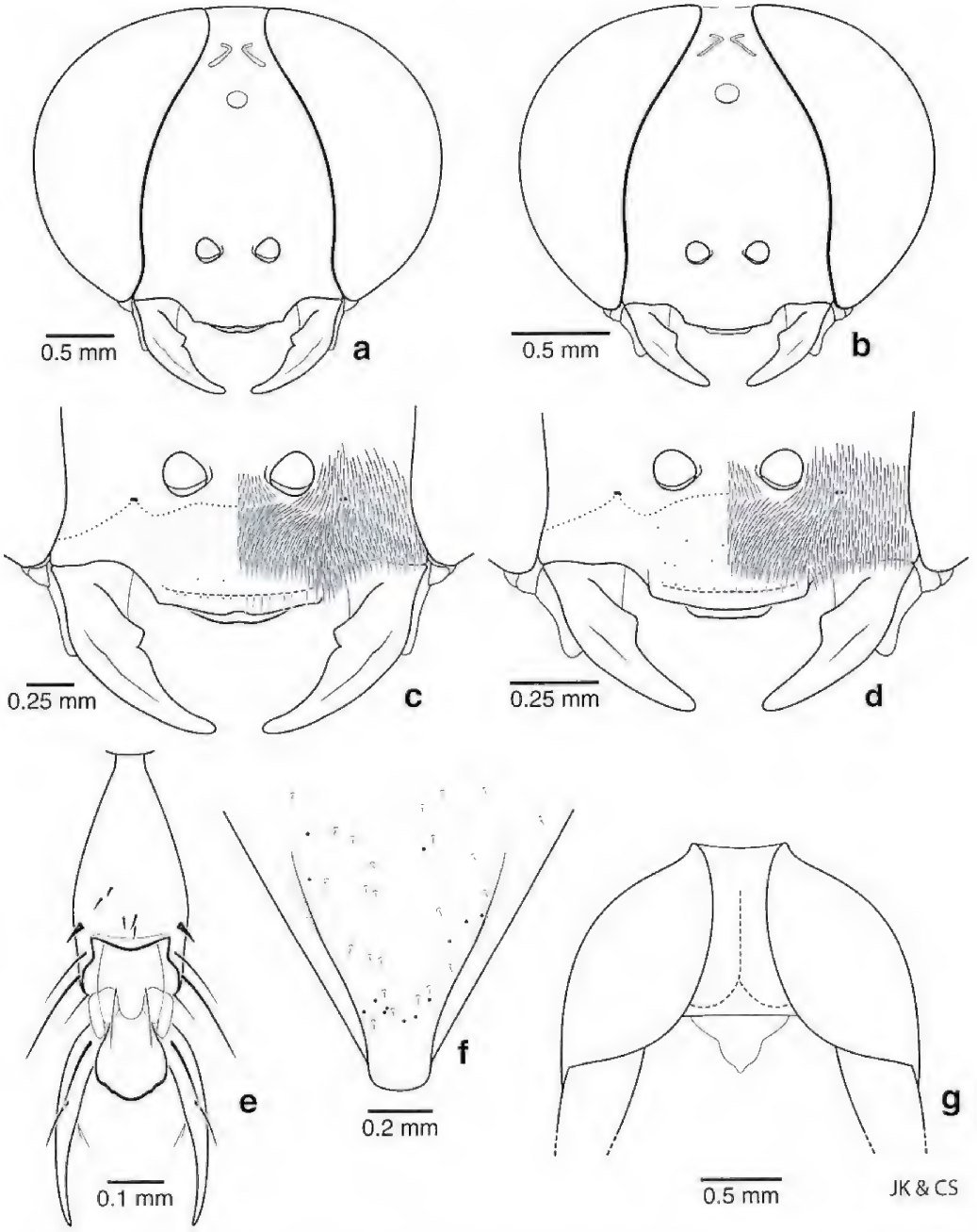

FIGURE 202. *Tachysphex kalaharicus* Arnold: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – female hindtarsomere V in ventral view; f – pygidial plate of female; g – gastral base of female in ventral view.

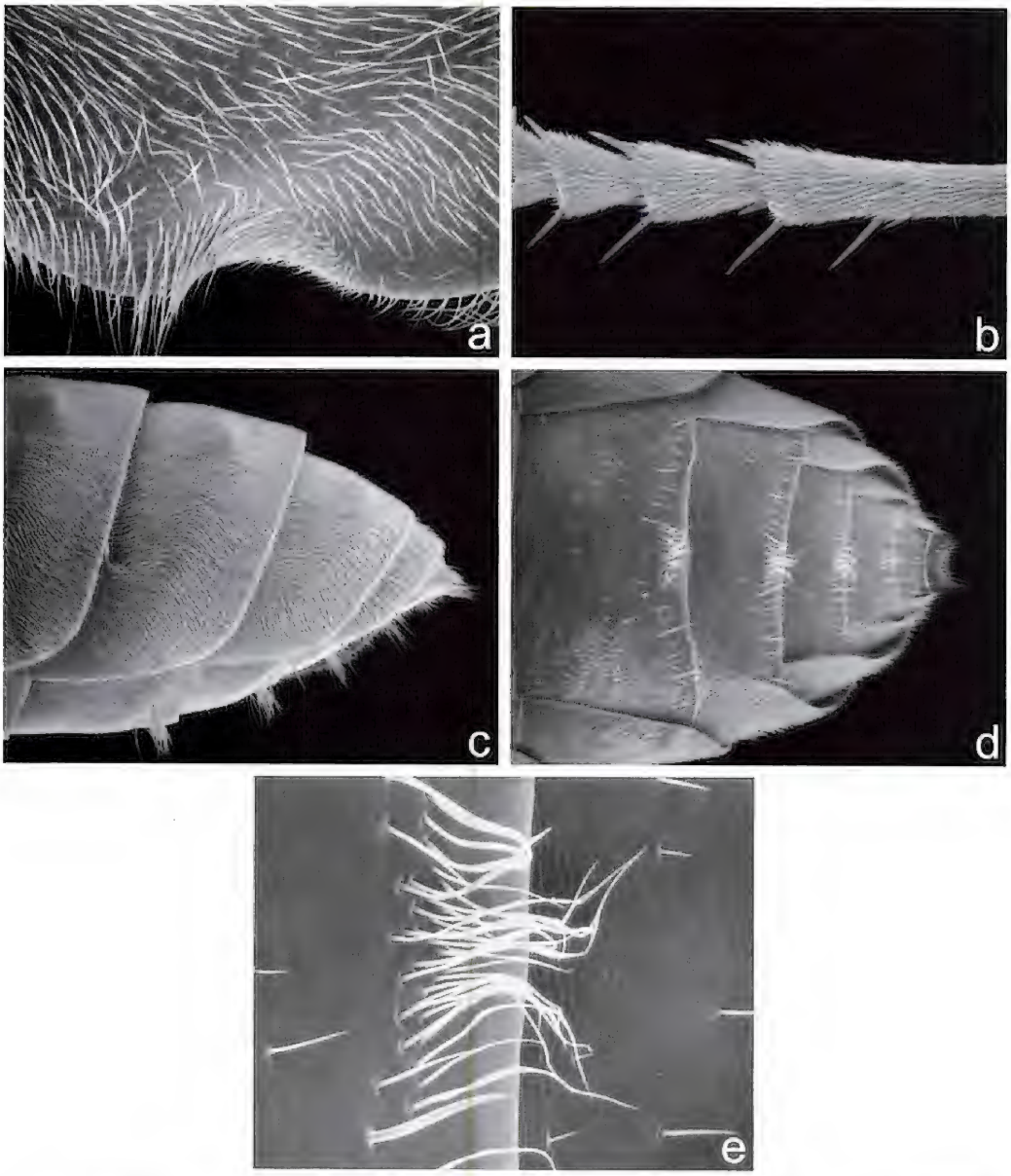

FIGURE 203. *Tachysphex kalaharicus* Arnold: a – basal portion of male forefemur with notch (×180); b – male foretarsomeres I–III (×90); c – gastral segments III–VII of male in lateral view (×38); d – gastral sterna III–VII of male in ventral view (×42); e – setae of male sternum IV (×240).

202a). Dorsal length of flagellomere I 2.0 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with seven or eight rake spines. Mid- and hindtarsomeres V, in most specimens, with central cluster of small spines on venter and one spine on each lateral margin (Fig. 202e), but without spines in single female from Chunzi, Malawi; hindtarsomere V in some specimens with a pair of subbasal spines; apicoventral margin of tarsomeres V convex

(Fig. 202e). Apical depression of tergum V impunctate, glabrous. Pygidial plate rounded apically (Fig. 202f). Length 8.2–10.6 mm.

♂.— Mandible: trimmal carina with tooth and at most rudimentary cleft. Clypeus (Fig. 202d): bevel shorter than basomedian area; lip free margin arcuate, with well-defined corner; distance between corners 1.2–1.3 × distance between corner and orbit. Width of postocellar area 0.2–0.4 × length (Fig. 202b). Dorsal length of flagellomere I 1.7–1.8 × apical width. Forefemoral notch densely, microscopically setose (Fig. 203a). Outer margin of forebasitarsus with varying number of rake spines: no preapical spines in most specimens, one preapical spine on left leg in male from Ellisras, two such spines on left leg in male from Victoria West, and three (on both legs) in one male from Shiloh; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomere V each with one preapical spine. Sternum III glabrous basomedially, sterna IV–VI largely glabrous (only apicolaterally so in specimens from Shiloh); sterna III–VI (also sternum II in many specimens) each with apicomedian setal fascia (Figs. 203c-e); length of fascial setae about 0.3–0.4 × basal mandibular width (most or all setae lost in worn specimens). Length 7.0–8.7 mm. Volsella and penis valve: Fig. 204.

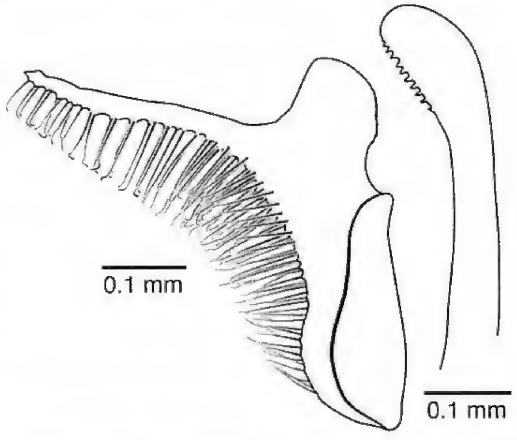

FIGURE 204. *Tachysphex kalaharicus* Arnold: a – volsella; b – penis valve.

VARIATION.— The three males from Shiloh, Zimbabwe (the type series of *scabrosus*), differ from the other specimens in having coarser thoracic sculpture, abundant erect, sinuous setae on all femoral venters, a well-developed setal fascia on sternum II (in addition to sterna III–VI), and an all black gaster.

GEOGRAPHIC DISTRIBUTION (Fig. 194).— Angola, Namibia, Botswana, Zimbabwe, Malawi, South Africa.

RECORDS.— **ANGOLA**: Folgares SE 1415Cc [= 14°45′–15°00′S 15°00′–15°15′E] (1 ♂, NMN). **BOTSWANA**: Palapye road (1 ♀, SAM, holotype of *kalaharicus*). **MALAWI**: Chunzi near Domira Bay (1 ♀, BMNH). **NAMIBIA**: **Bethanien District**: 25 mi W Helmeringhausen (1 ♂, BMNH). **Karasburg District**: Great Karas Mountains (1 ♂, SAM). **Karibib District**: Khan River 23 km N Karibib (2 ♀, 2 ♂; 1 ♂, NMN). **Lüderitz District**: Aus (3 ♂, MS). **Mariental District**: 73 km S Mariental (1 ♀), 20 km S Stampriet (1 ♂, FSCA). **Okahandja District**: Okahandja (1 ♀, BMNH; 1 ♀, OHL). **Outjo District**: 31 km SE Kamanjab (1 ♂). **Rehoboth District**: 15 km N Kalkrand (1 ♂; 1 ♀, 1 ♂, MS). **Windhoek District**: Aris 25 km S Windhoek (1 ♀; 1 ♂, MS), Regenstein 32 [Farm] (1 ♀, NMN), 25 km N Windhoek (1 ♀, MS), 28 km S Windhoek (1 ♀). **SOUTH AFRICA**: **Eastern Cape Province**: near Aberdeen (1 ♀, 1 ♂, RMNH), 12 km W Willowmore at 33°16′S 23°22′E (2 ♀, 1 ♂). **Free State**: Tussen Die Riviere Game Reserve (1 ♂). **Northern Cape Province**: 20 km N Pofadder (3 ♀, FSCA), Sutherland District (1 ♀, 1 ♂, SAM), Tanqua-Karoo National Park (2 ♀, 5 ♂, SAM), VanWyksfontein 8 km W Norvalspont (4 ♀, 13 ♂, AMG), Victoria West (1 ♂, AMG). **Northern Province**: Ellisras (2 ♂, AMG). **Western Cape Province**: Beaufort West: Oukloof (1 ♀, SAM), Kobee 10 km NE Vanrhynsdorp (1 ♂, OÖLM), Koup at 33°07′S 21°17′E (4 ♂), 13 km ENE Laingsburg at 33°11′S 20°59′E (1 ♂), Matjiesfontein (1 ♀, 4 ♂), Tierberg Farm 23 km NE Prince Albert (1 ♀, 8 ♂), Vanrhynsdorp (1 ♀, OÖLM), Vanrhyns Pass (1 ♂, BMNH). **ZIMBABWE**: Bulawayo (1 ♀, SAM), Nyamandhlovu at Umguza River (5 ♂, SAM), Sanyati Valley (1 ♀, SAM), Shiloh (3 ♂, SAM, holotype and paratypes of *scabrosus*).

***Tachysphex karoo* Pulawski, sp. nov.**
Figures 199, 205.

Derivation of name.— *Karoo*, supposedly of San (= Bushman) origin, but of uncertain etymology; now used for an arid tableland region of southern Africa; a noun in apposition to the generic name, with reference to the area where the species was collected.

Recognition.— *Tachysphex karoo* has the fore- and midfemoral venters and posteroventral surfaces impunctate except for a few, sparse punctures. In addition, the gaster is black, the propodeal dorsum evenly microareolate, the propodeal side unridged (except along the hindmargin), and the setae are appressed on the postocellar area and scutum.

The female differs from all species with the above characteristics, except *gessianus*, in having the femora and tibiae black. Also, flagellomere III has no sensory area, and sensory areas on flagellomeres IV–VIII are ill defined. In *gessianus*, by contrast, a well-defined sensory area is present on flagellomeres III–VIII each. The two species may also differ in the shape of the clypeal lip (which in *gessianus* has two lateral incisions on each side), but the lateral portion of the lip is worn off in the single female examined of *karoo*.

The male differs from similar species in having the following combination: free margin of clypeal lip shallowly concave on each side of midpoint, with obtuse, ill-defined corner (corners closer to each other than to adjacent orbit), sternal setae appressed, and apical depressions of sterna III–VI impunctate. In addition, the apical spine of foretarsomere II is shorter than tarsomere III, the femora are black, and the tibiae red.

Description.— Galea shiny, with several ill-defined punctures, in profile longer than wide, as long as 0.8 of scape. Scutal punctures well defined, averaging slightly more than one diameter apart on disk. Mesopleural punctures well defined, many diameters apart between scrobe and midcoxa. Episternal sulcus complete in female, evanescent anteroventrally in male. Propodeal dorsum evenly microsculptured; side punctate, evenly microsculptured along metapleural sulcus, narrowly ridged along posterior margin. Hindcoxal dorsum with inner margin carinate basally. Sternum I with longitudinal carina.

Setae straight on each side of oral fossa next to occipital carina, about as long as midocellar diameter; appressed on postocellar area and scutum; oriented posterad on propodeal dorsum.

Head and thorax black, mandible reddish mesally. Frontal setae lost in single female examined, golden in male. Wing membrane infumate; costal vein of forewing brown, subcostal vein black. Femora and gaster black, tibiae and tarsi black in female, red in male. Terga not fasciate or terga I–III with rudimentary apical fasciae.

♀.— Clypeus (Fig. 205a): bevel longer than basomedian area; lip free margin arcuate, largely worn off in single specimen examined. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 1.7 × apical width; flagellomeres IV–VIII with ill-defined sensory areas; length of flagellomere VIII 1.5 × width. Fore- and midfemoral venters and posteroventral surfaces almost unsculptured except for a few large punctures. Dorsal foretibial surface with two spines; outer surface asetose, with three spines. Forebasitarsus with nine or ten rake spines. Midtrochanteral venter with large punctures that are several diameters apart. Length of midtarsomere II 2.0 × apical width. Apical depression of tergum V impunctate, glabrous. Punctures of pygidial plate of two sizes, large and small, averaging several diameters apart; interspaces microsculptured. Length 9.8 mm.

♂.— Mandible: trimmal carina with tooth, cleft present or absent. Clypeus (Fig. 205b): bevel shorter than basomedian area; lip free margin obtusely triangular (slightly concave between midpoint and corner), corner ill defined; distance between corners 0.7–0.8 × distance between corner and orbit. Width of postocellar area 0.9 × length. Dorsal length of flagellomere I 1.8 × apical width.

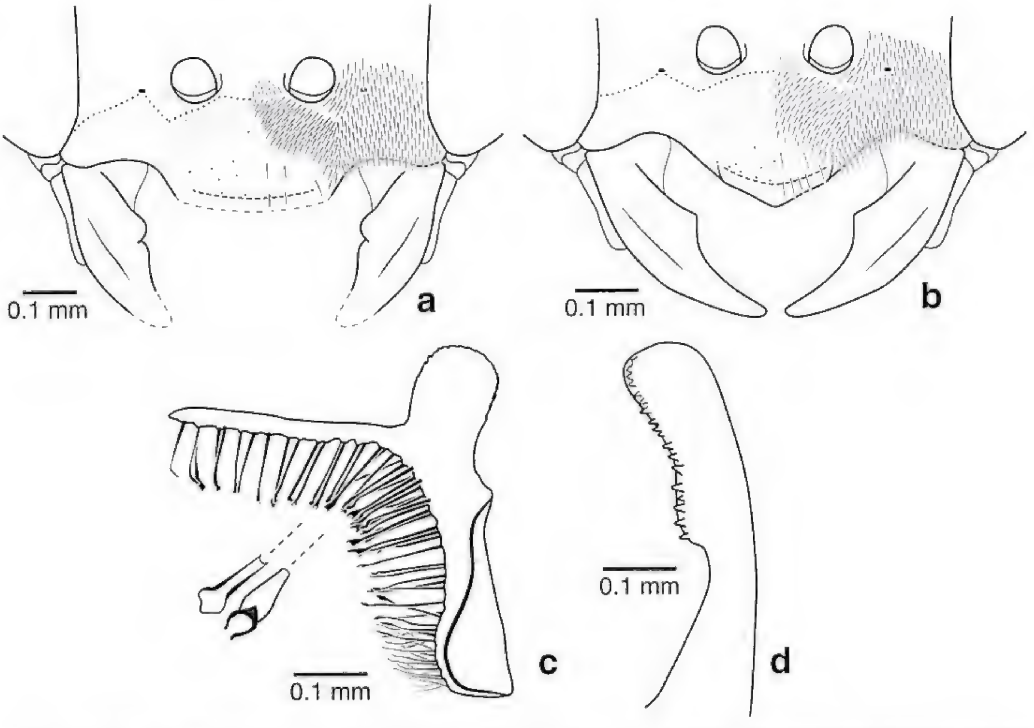

FIGURE 205. *Tachysphex karoo* Pulawski, sp. nov.: a – female clypeus and mandible (broken line indicates reconstructed body parts); b – male clypeus and mandible; c – volsella; d – penis valve.

Forefemoral notch small, setose. Outer margin of forebasitarsus without preapical spines or with two such spines (near midlength and next to apical spine); outer apical spine of foretarsomere II shorter than tarsomere III. Apical depressions of sterna III–VI impunctate. Sternum VIII obtusely tridentate apically. Length 8.1–9.1 mm. Volsella and penis valve: Figs. 205c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 199).— Known from a single locality in the Little Karoo, South Africa.

RECORDS.— HOLOTYPE: ♂, **SOUTH AFRICA**: **Western Cape Province**: 5 km W Robertson, 6 Jan 1997, WJP (CAS). PARATYPES: same data as holotype (1 ♀, 4 ♂).

Tachysphex khoikhoi Pulawski, sp. nov.

Figures 206, 207.

DERIVATION OF NAME.— *Khoikhoi*, or *men of men*, the early pastoralist inhabitants of northwestern South Africa, where the type locality is located; a noun in apposition to the generic name.

RECOGNITION.— *Tachysphex khoikhoi* has unsculptured fore- and midfemoral venters and posteroventral surfaces, a punctate mesopleuron, ridged propodeal side, erect setae of the postocellar area (setal length about one midocellar diameter), black gaster and femora, and nonfasciate terga.

In addition, the female has an unusually broad clypeal lobe (distance between lip corners about 1.8 × clypeal midline). The following details of the single specimen examined are also unusual: gena unsculptured adjacent to orbit (as in *limatus*), and terga II–IV mesally with evanescent punctures that are several diameters apart. These features, however, may be individual rather than

species-specific as they are not present in the male. Unlike *limatus*, the apical flagellomeres of the female of *khoikhoi* are not shortened (e.g., length of flagellomere VIII is about 2.5 × width, versus 1.2 × in *limatus*).

The male of *khoikhoi* differs from the other species with similar femora in having an unusually narrow clypeal lip (distance between corners 0.5–0.7 × distance between a corner and the adjacent orbit) with an evenly arcuate free margin (Fig. 206d). In addition, the labrum is flat (barely or not protruding beyond the clypeal free margin) and the foretarsal rake is short (outer apical spine of foretarsomere II shorter than tarsomere III).

Description.— Galea with a few, sparse punctures, slightly longer than wide in profile, about as long as 0.7 of scape. Scutal and mesopleural punctures well defined (minute in female), averaging several diameters apart on scutal disk and at center of mesopleuron; interspaces unsculptured, varying in size. Punctures of mesothoracic venter, in female, averaging many diameters apart. Propodeal dorsum varying from almost evenly areolate to rugose or longitudinally ridged (unsculptured laterally in single female examined); side ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I with longitudinal carina in female and some males.

Setae suberect on each side of oral fossa next to occipital carina, erect on postocellar area (Figs. 206a, b) and nearly so on scutum, about as long as midocellar diameter; inclined posterad on propodeal dorsum. Female sternum I glabrous in apical half.

Head and thorax black, mandible reddish except basally and apically. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate; costal vein of forewing light brown, subcostal vein dark brown (respectively dark brown and almost black in male from Knersvlakte). Femora black or hindfemur red apically; tibiae and tarsi red in most males (foretibia partly black in one), but all black in female and in male from Knersvlakte. Gaster black. Terga without silvery, apical fasciae.

♀.— Clypeus (Fig. 206c): lobe unusually broad (distance between lip corners about 1.8 × clypeal middlength); bevel longer than basomedian area; lip free margin arcuate, with two shallow, lateral incisions on each side. Width of postocellar area 0.9 × length (Fig. 206a). Gena unsculptured adjacent to orbit. Scapal venter unsculptured. Dorsal length of flagellomere I 2.3 × apical width. Trochanteral venters impunctate. Fore- and midfemoral venters and posteroventral surfaces unsculptured except for a few, sparse punctures. Dorsal foretibial surface with two thin spines; outer surface with one thin spine, practically unsculptured, glabrous. Forebasitarsus with five rake spines. Terga II–IV mesally with evanescent punctures that are several diameters apart (except those that delimit apical depressions are well defined); tergum V unsculptured and glabrous except for punctures that delimit apical depression. Pygidial plate with punctures that average many diameters apart; interspaces unsculptured. Length 6.2 mm.

♂.— Mandible: trimmal carina with well-defined tooth, without cleft. Clypeus (Fig. 206d): bevel ill defined, about as long as basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin arcuate, with somewhat ill-defined corner; distance between corners about 0.5–0.7 × that between corner and orbit. Width of postocellar area 1.0–1.2 × length (Fig. 206b). Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral posteroventral surface and midfemoral posterior surface and venter shiny, unsculptured, except for a few, sparse punctures. Forefemoral notch with microscopically setose bottom. Foretibial outer surface asetose, with fine spines. Outer margin of forebasitarsus with 2–4 rake spines; outer apical spine of foretarsomere II no longer than tarsomere III. Venter of tarsomeres V, in most specimens, with one preapical spine. Length 5.2–8.0 mm. Volsella and penis valve: Figs. 206e, f.

Geographic distribution (Fig. 207).— Namaqualand region of South Africa.

Records.— Holotype: ♀, **SOUTH AFRICA: Northern Cape Province**: Goegap Nature Reserve

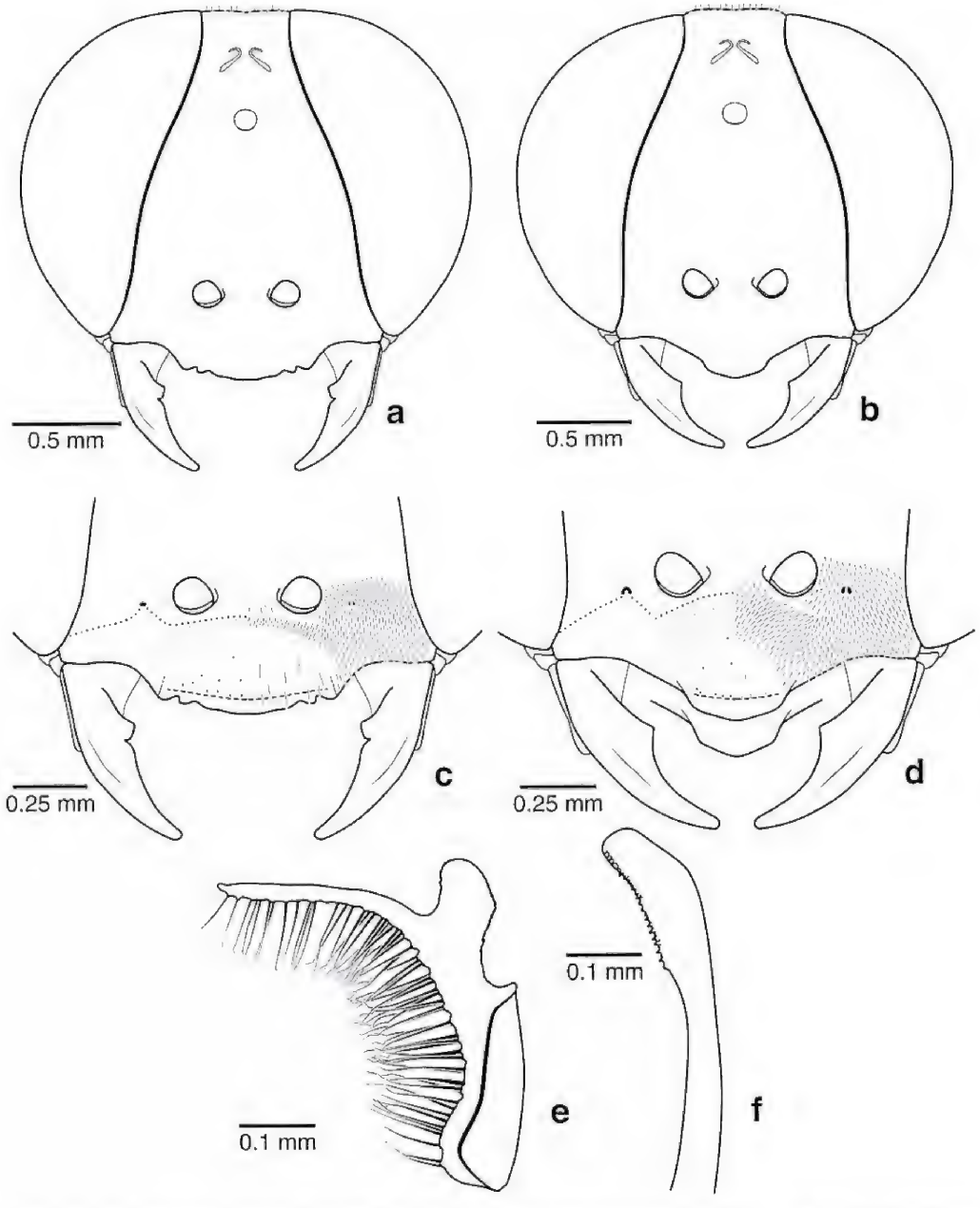

FIGURE 206. *Tachysphex khoikhoi* Pulawski, sp. nov.: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

near Kraaiwater at 29°37′S 18°00′E, 3–4 Oct 1994, FSG (AMG). PARATYPES: **SOUTH AFRICA**: **Northern Cape Province**: 90 km ENE Springbok at 29°20.1′S 18°44.3′E, 10 Sept 2001, WJP (6 ♂). **Western Cape Province**: Knersvlakte 48 km N Vanrhynsdorp at 31°14′S 18°32′E, 20 Sept 1996, F.W., S.K., and R. Gess (1 ♂, AMG).

Tachysphex lacertosus Arnold

Figures 207, 208.

Tachysphex lacertosus Arnold, 1944:25, ♀. Holotype: ♀, Zimbabwe: Kami (SAM), examined.— Bohart and Menke, 1976:274 (listed).

Tachysphex arenarius Arnold, 1947:149, ♂. Holotype: ♂, Zimbabwe: Bembesi (SAM), examined. **New synonym**.— Bohart and Menke, 1976:272 (listed).

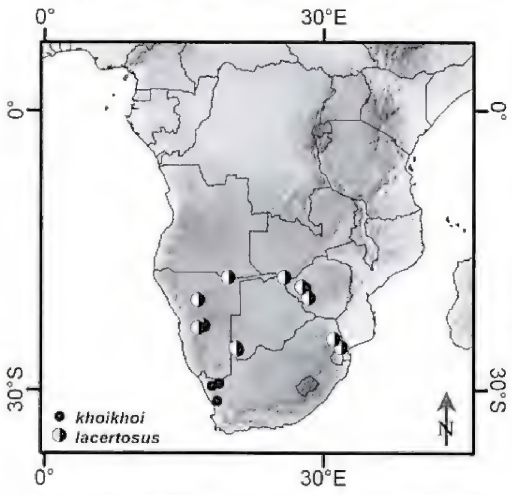

FIGURE 207. Collecting localities of *Tachysphex khoikhoi* and *lacertosus*.

RECOGNITION.— *Tachysphex lacertosus* has a convex labrum (protruding beyond the clypeal free margin), galea as long as the scape or nearly so, propodeal dorsum with a glabrous apicomedian area of varying size (Fig. 208c), nearly reduced in some specimens, and gaster all black or the female pygidial plate reddish. *Tachysphex claripes*, *diabolicus*, and *psilonotus* share the same combination of characters, but in *lacertosus* the setae of the episcrobal area are nearly appressed and shorter than midocellar diameter (whereas erect or nearly so and at least as long as midocellar diameter in the other three species). Subsidiary recognition features (varying in the other three species) are the following: galea minutely, closely punctate except anteriorly, both costal and subcostal veins of the forewing reddish brown, nearly identical in color, terga I–III fasciate apically (nonfasciate in *diabolicus*), female forefemur with pubescence that largely conceals the posteroventral surface, and apical male sterna with appressed setae.

JUSTIFICATION OF NEW SYNONYMY.— The holotypes of *Tachysphex arenarius* and *lacertosus* are the opposite sexes of one species. These names are therefore synonyms.

DESCRIPTION.— Labrum convex (but less so than in *panzeri* or *pentheri*), protruding from beneath clypeus. Galea densely punctate except anteriorly (punctures about one diameter apart), as long as 0.9–1.0 of scape. Scutal punctures minute, about one diameter apart. Mesopleuron dull, uniformly micropunctate. Propodeal dorsum evenly microareolate, side mostly ridged, but uniformly microsculptured in many males. Hindcoxal dorsum with inner margin carinate basally (carina evanescent in smallest males).

Setae appressed on gena, postocellar area, scutum, and propodeal dorsum; in some specimens a few setae erect on each side of oral fossa next to occipital carina (setal length about one midocellar diameter); propodeal dorsum with apicomedian glabrous area (Fig. 208c) of varying size (in some specimens, no more than twice midocellar diameter); remaining dorsal surface with setae that are oriented posterad except laterally, oriented posteromesad near base.

Head, thorax, and gaster black, mandible reddish mesally, female pygidial plate black to reddish. Frontal setae silvery in female, golden in male. Wing membrane yellowish; forewing costal and subcostal veins light brown, practically identical in color. Femora black. Female tibiae black except inner surface of foretibia red, also outer surface of midtibia in some specimens; male foretibia all red, mid- and hindtibiae varying from all red to all black. Tarsi varying from black basally and red distally to all red. Terga I–III silvery fasciate apically.

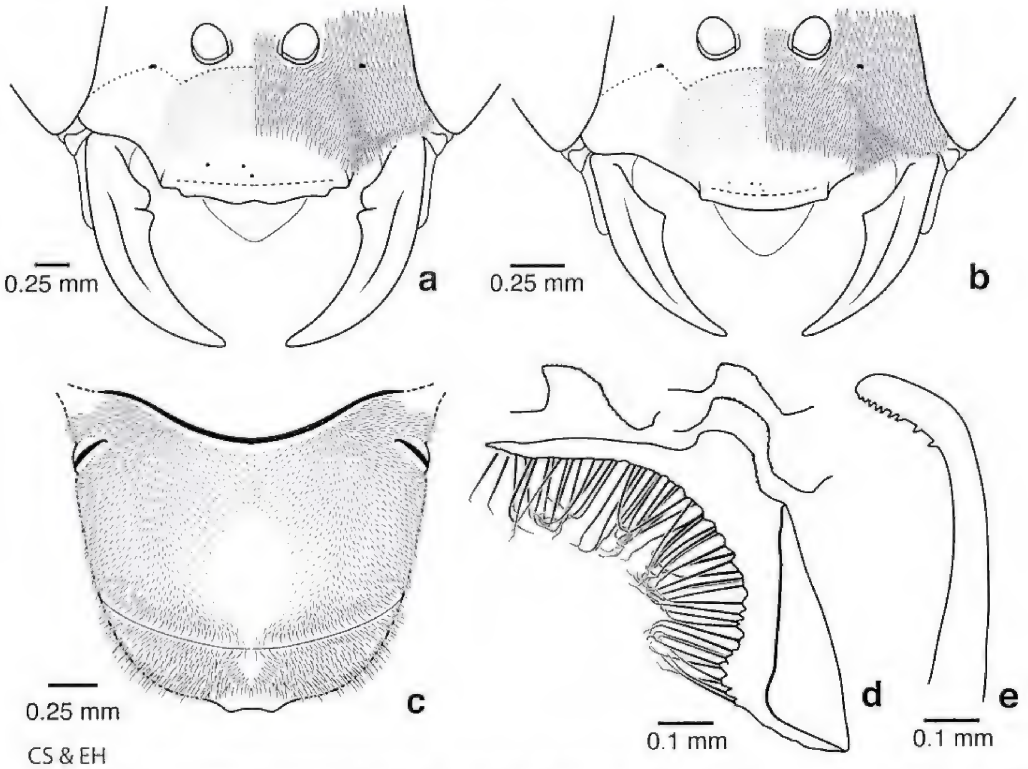

FIGURE 208. *Tachysphex lacertosus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum showing setal pattern; d – volsella with outlines showing variation; e – penis valve.

♀.— Clypeus (Fig. 208a): bevel about as long as basomedian area; lip free margin arcuate, emarginate mesally, sinuous laterally. Width of postocellar area 1.0–1.1 × length. Dorsal length of flagellomere I 2.5–2.7 × apical width. Dorsal foretibial surface with two spines; outer surface with one to three spines. Forebasitarsus with 7–9 rake spines. Apical spines of hindtarsomere IV reaching claw bases or nearly so. Apical depression of tergum V densely punctate and setose. Pygidial plate: punctures averaging several diameters apart (many punctures less than one diameters apart in some specimens), interspaces microsculptured to unsculptured. Length 11.8–12.2 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 208b): bevel shorter than basomedian area; lip free margin arcuate, obtusely pointed mesally in largest specimens; corner well defined to ill defined; distance between corners 0.9–1.1 × distance between corner and orbit. Width of postocellar area 0.8–1.1 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Apical margin of sternum VIII varying from mesally dentate (tooth pointed to rounded) to evenly arcuate between lateral prongs. Length 6.7–10.2 mm. Volsella and penis valve: Figs. 208d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 207).— Namibia to Zimbabwe, northern South Africa.

RECORDS.— BOTSWANA: 1.5 km E Cheleka in Gemsbok National Park (1 ♀, 1 ♂). **NAMIBIA**: **Otjiwarongo District**: 15–20 km NW Otjiwarongo (1 ♂). **Rehoboth District**: 23 km N Rehoboth (1 ♂, MS). **Rundu District**: Rundu (1 ♀; 1 ♀, JG). **Windhoek District**: Gamsberg east of Pass (1 ♂; 4 ♂, AMG).

SOUTH AFRICA: **Mpumalanga**: Nevington: Komati Poort (1 ♀, AMG). **Northern Cape Province**: Nossob in Kalahari Gemsbok National Park (2 ♂; 1 ♀, 2 ♂, MS). **Northern Province**: Guernsey Farm 15 km E Klaserie (6 ♀, 1 ♂, PMA). **ZIMBABWE**: Bembesi River (1 ♂, SAM, holotype of *arenarius* according to the original description, but not designated as such), Kami Ruins (2 ♂; 1 ♀, SAM, holotype of *lacertosus*), Lupane (1 ♀, OÖLM; 4 ♂, SAM, including 1 designated as holotype and 1 paratype of *arenarius*), Victoria Falls (3 ♀, 18 ♂).

Tachysphex limatus Arnold

Figures 209–211.

Tachysphex limatus Arnold, 1924:53, ♀. Holotype: ♀, South Africa: Eastern Cape Province: Willowmore (TMP), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:274 (listed).

Recognition.— *Tachysphex limatus* is unusual in having the gena adjacent to the orbit shiny and largely unsculptured. The only other *Tachysphex* with unsculptured gena is the female of *khoikhoi* (only one specimen examined), in which the clypeal lobe is unusually wide (distance between lip corners about 1.8 × clypeal midline, while about 1.3 in the female of *limatus*). Subsidiary recognition features of *limatus* are: mid- and hindtibiae with a narrow, unsculptured zone dorsally; apical female flagellomeres unusually short (e.g., length of flagellomere VIII equals 1.2 × width); female fore-and midfemoral venters unsculptured except for a few, sparse punctures, as is male forefemoral posteroventral surface and midfemoral venter and posterior surface. The nonfasciate terga also help in identification. The clypeus of most females is unique in that the middle section is all shiny, with only a few, sparse punctures (Fig. 209e).

Description.— Gena broad in dorsal view (Figs. 209a, b), broadly impunctate next to orbit or at most with a few, sparse punctures. Scutal punctures several to many diameters apart in female, averaging 1–2 to several diameters apart on disk in male. Mesopleural punctures well defined, averaging two to several diameters apart beneath scrobe, and also on mesothoracic venter (at least adjacent to midline); interspaces unsculptured, shiny. Episternal sulcus complete in some specimens. Propodeal dorsum rugose or irregularly, longitudinally ridged; side varying from ridged, with punctate interspaces, to punctate, with unsculptured interspaces; posterior surface ridged or ridges evanescent (then integument punctate). Hindcoxal dorsum with inner margin carinate basally. Mid- and hindtibial dorsum unsculptured and glabrous between spines. Sternum I with longitudinal carina apically.

Setae erect on each side of oral fossa next to occipital carina, on postocellar area, and on mesopleuron, inclined posterad on scutum and propodeal dorsum; setal length slightly more than midocellar diameter.

Head and thorax black, mandible yellowish red (except apically); flagellum of many specimens partly yellowish brown. Frontal setae inconspicuous in female, golden in male. Wing membrane slightly infumate; forewing costal vein light brown or reddish, subcostal vein dark brown (all or largely so). Femora black or midfemur largely and hindfemur all red. Tibiae and tarsi red. Gaster all black or segments I and II or I–III all or partly red. Terga without silvery setal fasciae.

♀.— Clypeus (Fig. 209e): middle section in most specimens all shiny, with a few, sparse punctures, but densely, minutely punctate basally in a female from Papendorp; lip free margin arcuate, prominent mesally, with one or two lateral incisions on each side. Frons and postocellar area unsculptured between punctures. Width of postocellar area 1.0–1.4 × length (Fig. 209c). Dorsal length of flagellomere I 1.6 × apical width; flagellomeres IV–IX with sensory areas; apical flagellomeres unusually short (e.g., length of flagellomere VIII 1.2 × width). Fore- and midfemoral venters with only a few, sparse punctures. Dorsal foretibial surface without spines or bristles or with

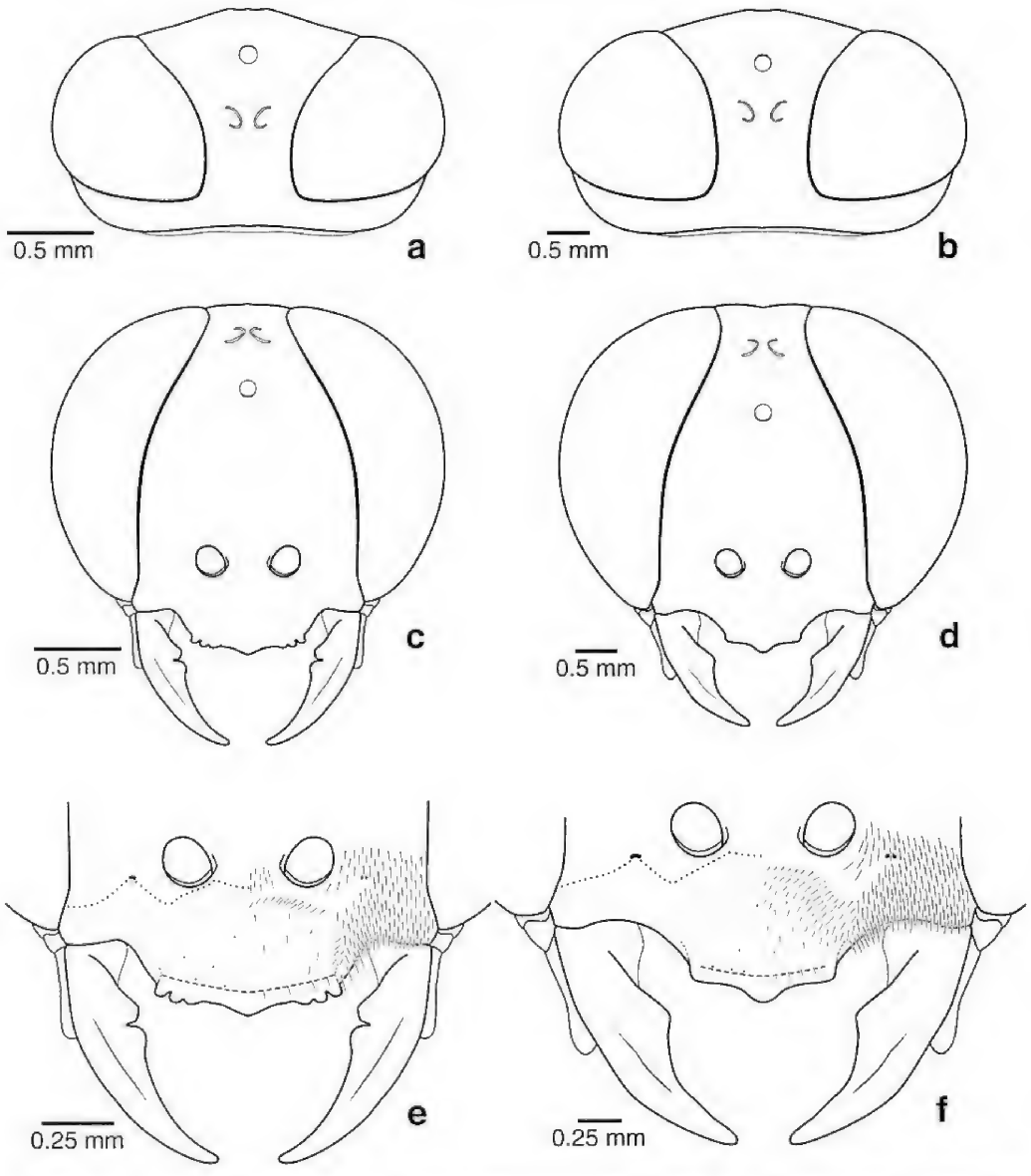

FIGURE 209. *Tachysphex limatus* Arnold: a – female head in dorsal view; b – male head in dorsal view; c – female head in frontal view; d – male head in frontal view; e – female clypeus and mandible; f – male clypeus and mandible.

up to four long bristles; outer surface impunctate, glabrous, with one bristle near midlength. Forebasitarsus with six or seven rake spines, but with 17 spines in females from Papendorp. Apical depression of tergum V unsculptured, asetose. Length 8.1–9.2 mm.

♂.— Mandible: trimmal carina with widely obtuse tooth, without cleft. Clypeus (Fig. 209f): bevel either not differentiated, or ill defined (punctures two to several diameters apart anteromesally), or markedly longer than basomedian area; lip free margin mesally angulate or with tooth-like projection, corner prominent; distance between corners 1.0 × distance between corner and orbit.

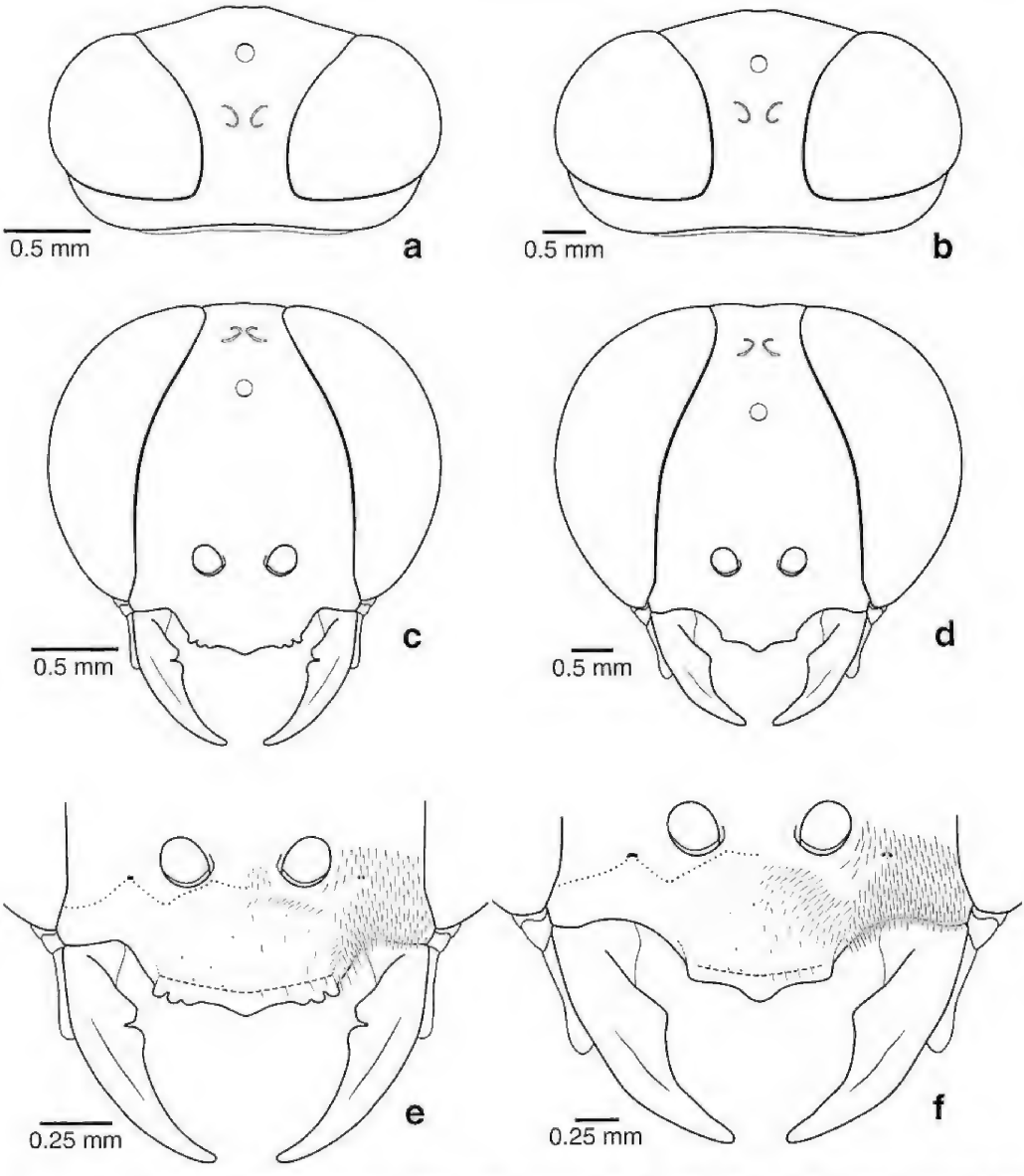

FIGURE 209. *Tachysphex limatus* Arnold: a – female head in dorsal view; b – male head in dorsal view; c – female head in frontal view; d – male head in frontal view; e – female clypeus and mandible; f – male clypeus and mandible.

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♂.— Mandible: trimmal carina with widely obtuse tooth, without cleft. Clypeus (Fig. 209f): bevel either not differentiated, or ill defined (punctures two to several diameters apart anteromesally), or markedly longer than basomedian area; lip free margin mesally angulate or with tooth-like projection, corner prominent; distance between corners 1.0 × distance between corner and orbit.

Width of postocellar area 0.9–1.0 × length (Fig. 209d). Dorsal length of flagellomere I 1.5 × apical width. Forefemoral notch glabrous, slightly larger than average for the genus. Posteroventral forefemoral surface and midfemoral venter and posterior surface unsculptured except for a few, sparse punctures. Outer margin of forebasitarsus mostly with three or four spines, but with nine spines in specimen from Klaarstroom-Prince Albert area; outer apical spine of foretarsomere II longer than tarsomere III. Sternal punctures well defined, several diameters apart mesally. Length 6.1–8.3 mm. Volsella and penis valve: Fig. 210.

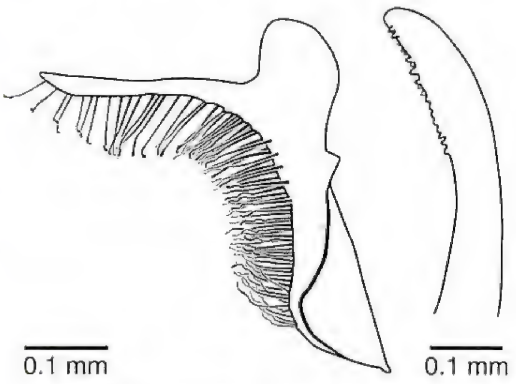


FIGURE 210. *Tachysphex limatus* Arnold: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 211).— Western South Africa, southern Namibia.

RECORDS.— **NAMIBIA**: **Lüderitz District**: Heioab at 27°24.4′S 16°00.2′E (1 ♂, AMG). **SOUTH AFRICA**: **Eastern Cape Province**: Willowmore (1 ♀, TMP, holotype of *limatus*). **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♂, PPRI), Goegap Nature Reserve (3 ♂, AMG), Groenriviersmond (1 ♀, 1 ♂, OÖLM), E Kamieskroon (1 ♀, OÖLM), near Richtersveld National Park between Annis and Dabie Rivers at 28°20′S 16°55′E (1 ♂; 1 ♀, 1 ♂, AMG), Tanqua-Karoo National Park: Waterval (1 ♀, 1 ♂, SAM). **Western Cape Province**: Ashton (1 ♂, OÖLM), Bains Kloof in Wit River Valley (1 ♂, SAM), Bulshoek between Klawer and Clanwilliam (1 ♀, SAM), Cape Peninsula (1 ♂, BMNH), 60 km N Cape Town (1 ♂, OÖLM), Cederberg 15–30 km SE Clanwilliam (1 ♂, USU), 36 mi NE Ceres (1 ♂, UCD), 20 km N Citrusdal (4 ♀, 7 ♂, OÖLM), 11 km W Clanwilliam (1 ♂; 3 ♂, AMG), Doringbos at 31°58′19″S 19°13′33″E (1 ♀, CSE), Het Kruis (1 ♂, SAM), Kalgat Farm 55 km NE Vanrhynsdorp at 31°07′30″S 18°55′30″E (2 ♂, CAS, OHL), Klaarstrom-Prince Albert (2 ♂, SAM), Knersvlakte (1 ♂; 2 ♂, SAM), Kommetjie (2 ♂, AMNH), S Lambert's Bay (1 ♂, OÖLM), 40 km S Lambert's Bay (1 ♂, OÖLM), Matjiesfontein (2 ♂, BMNH), Montagu (5 ♂, BMNH), 5 km E Montagu (1 ♂, UCD), Oudtshoorn-Zebra (1 ♂, SAM), Papendorp (now Woodstock) E Cape Town (2 ♀; 1 ♀, SAM), Rooinek Pass (1 ♀, SAM), Sevenweeks Poort-Rooinek Pass (1 ♂), Wellington: Rooshoek (1 ♂, RMNH).

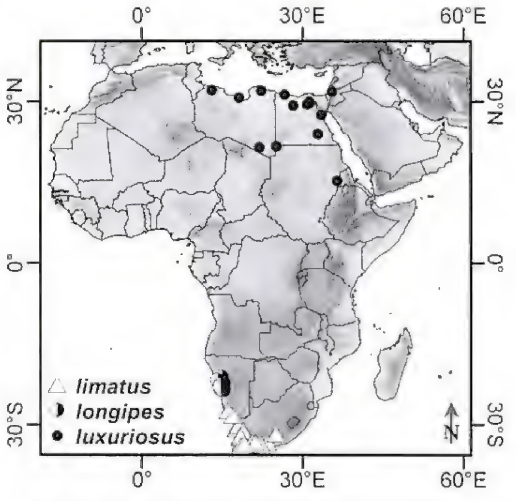


FIGURE 211. Collecting localities of *Tachysphex limatus*, *longipes*, and *luxuriosus*.

Tachysphex lindbergi de Beaumont

Figures 212, 213.

Tachysphex lindbergi de Beaumont, 1956b:3, ♀. Holotype: ♀, Cape Verde Islands: Santo Antão Island: Chã de Morte (Zool. Mus. Helsinki), not examined.— Pulawski, 1971:166 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed); Erlandsson, 1978:205 (Madeira); Simon Thomas and Wiering, 1993:404 (description of ♂); Smit, 2000:175 (Madeira).

Tachysphex sp.: Groh, 1982:260 (Cape Verde Islands), corrected to *Tachysphex lindbergi* by Simon Thomas and Wiering, 1993:405.

Width of postocellar area 0.9–1.0 × length (Fig. 209d). Dorsal length of flagellomere I 1.5 × apical width. Forefemoral notch glabrous, slightly larger than average for the genus. Posteroventral forefemoral surface and midfemoral venter and posterior surface unsculptured except for a few, sparse punctures. Outer margin of forebasitarsus mostly with three or four spines, but with nine spines in specimen from Klaarstroom-Prince Albert area; outer apical spine of foretarsomere II longer than tarsomere III. Sternal punctures well defined, several diameters apart mesally. Length 6.1–8.3 mm. Volsella and penis valve: Fig. 210.

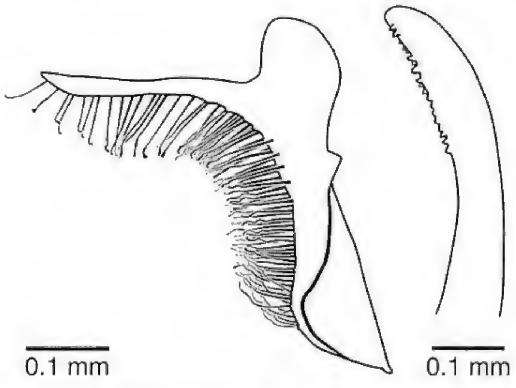


FIGURE 210. *Tachysphex limatus* Arnold: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 211).— Western South Africa, southern Namibia.

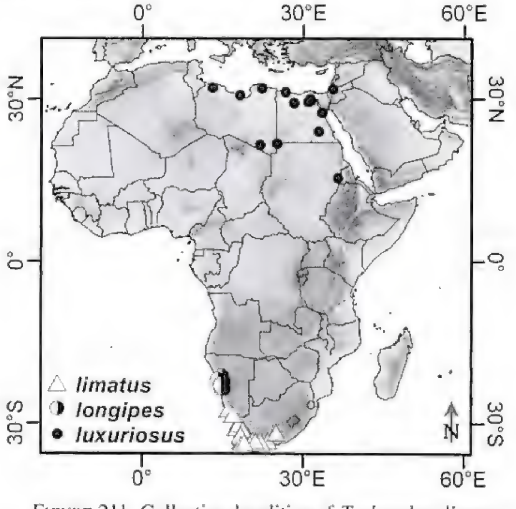


FIGURE 211. Collecting localities of *Tachysphex limatus*, *longipes*, and *luxuriosus*.

RECORDS.— **NAMIBIA**: **Lüderitz District**: Heloab at 27°24.4′S 16°00.2′E (1 ♂, AMG). **SOUTH AFRICA**: **Eastern Cape Province**: Willowmore (1 ♀, TMP, holotype of *limatus*). **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♂, PPRI), Goegap Nature Reserve (3 ♂, AMG), Groenriviersmond (1 ♀, 1 ♂, OÖLM), E Kamieskroon (1 ♀, OÖLM), near Richtersveld National Park between Annis and Dabie Rivers at 28°20′S 16°55′E (1 ♂; 1 ♀, 1 ♂, AMG), Tanqua-Karoo National Park: Waterval (1 ♀, 1 ♂, SAM). **Western Cape Province**: Ashton (1 ♂, OÖLM), Bains Kloof in Wit River Valley (1 ♂, SAM), Bulshoek between Klawer and Clanwilliam (1 ♀, SAM), Cape Peninsula (1 ♂, BMNH), 60 km N Cape Town (1 ♂, OÖLM), Cederberg 15–30 km SE Clanwilliam (1 ♂, USU), 36 mi NE Ceres (1 ♂, UCD), 20 km N Citrusdal (4 ♀, 7 ♂, OÖLM), 11 km W Clanwilliam (1 ♂; 3 ♂, AMG), Doringbos at 31°58′19″S 19°13′33″E (1 ♀, CSE), Het Kruis (1 ♂, SAM), Kalgat Farm 55 km NE Vanrhynsdorp at 31°07′30″S 18°55′30″E (2 ♂, CAS, OHL), Klaarstrom-Prince Albert (2 ♂, SAM), Knersvlakte (1 ♂; 2 ♂, SAM), Kommetjie (2 ♂, AMNH), S Lambert's Bay (1 ♂, OÖLM), 40 km S Lambert's Bay (1 ♂, OÖLM), Matjiesfontein (2 ♂, BMNH), Montagu (5 ♂, BMNH), 5 km E Montagu (1 ♂, UCD), Oudtshoorn-Zebra (1 ♂, SAM), Papendorp (now Woodstock) E Cape Town (2 ♀; 1 ♀, SAM), Rooinek Pass (1 ♀, SAM), Sevenweeks Poort-Rooinek Pass (1 ♂), Wellington: Rooshoek (1 ♂, RMNH).

Tachysphex lindbergi de Beaumont

Figures 212, 213.

Tachysphex lindbergi de Beaumont, 1956b:3, ♀. Holotype: ♀, Cape Verde Islands: Santo Antão Island: Chã de Morte (Zool. Mus. Helsinki), not examined.— Pulawski, 1971:166 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed); Erlandsson, 1978:205 (Madeira); Simon Thomas and Wiering, 1993:404 (description of ♂); Smit, 2000:175 (Madeira).

Tachysphex sp.: Groh, 1982:260 (Cape Verde Islands), corrected to *Tachysphex lindbergi* by Simon Thomas and Wiering, 1993:405.

Recognition.— *Tachysphex lindbergi*, known only from Cape Verde Islands and Madeira, is one of the species that have an all black body, well-defined scutal and mesopleural punctures (mesopleural punctures minute in some specimens), labrum flat and galea shorter than wide, hindwing crossvein cu-a vertical, setae erect on the postocellar area and diverging anterad from the midline on the propodeal dorsum, and unspecialized female tarsi (length of midtarsomere II more than twice width and that of hindtarsomere IV more than width, apical tarsomeres without spines on venter or lateral margins).

The female is further characterized by the presence of a well-defined, evenly convex clypeal bevel that is shorter than the basomedian area (Fig. 212a), clypeal lip not emarginate laterally, and presence of only three apical tergal fasciae. Females of other species are similar, but *lindbergi* can be recognized, with some difficulty, by its relatively sparse mesopleural punctures (more than one diameter apart at mesopleuron center). In most other species, these punctures are no more than one diameter apart, mostly less. The mesopleural punctures are also sparse in the southern African *aterrimus* which, however, has the frons either coriaceous or a sparsely punctate and a flat middle clypeal section, with an ill-defined bevel. In *lindbergi*, the frons is punctate, with punctures about one diameter apart and interspaces varying from unsculptured to conspicuously microsculptured.

The male can be recognized by the sculpture and proportions of the clypeal middle section (Fig. 212b) which has a short bevel, an evenly arcuate, not widened mesally lip, a well-defined but nonprominent lip corner (corners equidistant from each other and the adjacent orbit or closer to orbit), and the clypeal midline less than the distance between the lip corners, at least minimally so. Subsidiary recognition features are: forebasitarsus at most with one preapical rake spine, postocellar area narrow (width about 1.3–1.4 × length), and distal volsellar portion without setae (Fig. 212c).

Description.— Scutal punctures well defined, averaging about one to about two diameters apart on disk. Mesopleural punctures varying from large to minute (many females), more than one diameter apart (several diameters apart in many specimens, but about one diameter apart in some males); interspaces at least slightly microsculptured. Propodeal dorsum varying from irregularly ridged longitudinally to finely rugose; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae (numbers in parentheses represent setal length expressed as fractions of basal mandibular width): erect on each side of oral fossa next to occipital carina (0.4), erect on postocellar area (0.3–0.4) and on scutum anteriorly (0.2–0.3); inclined anterad on propodeal dorsum.

Head and thorax black, mandible reddish preapically. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal and subcostal veins of forewing dark brown. Legs and gaster black. Terga I–III in female, I–IV in male, silvery fasciate apically.

♀.— Clypeus (Fig. 212a): bevel shorter than basomedian area (only slightly so in some specimens); lip free margin arcuate, not incised laterally. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 2.0–2.3 × apical width. Dorsal foretibial surface with one or two spines; outer surface with one spine that is located near midlength. Forebasitarsus with six or seven rake spines. Apical depression of tergum V asetose. Pygidial plate finely microsculptured and with sparse punctures. Length 8.5–9.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 212b): bevel shorter than basomedian area; lip free margin arcuate, with well-defined, somewhat prominent corner; corners equidistant from each other and from respective orbit or closer to orbit. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 1.4–1.5 × apical width, equal to about 0.7 of flagellomere II. Forefemoral notch with microscopically setose bottom. Outer margin of forebasitarsus without preapical spines or with one or two such spines (which are located near tarsomere's

Recognition.— *Tachysphex lindbergi*, known only from Cape Verde Islands and Madeira, is one of the species that have an all black body, well-defined scutal and mesopleural punctures (mesopleural punctures minute in some specimens), labrum flat and galea shorter than wide, hindwing crossvein cu-a vertical, setae erect on the postocellar area and diverging anterad from the midline on the propodeal dorsum, and unspecialized female tarsi (length of midtarsomere II more than twice width and that of hindtarsomere IV more than width, apical tarsomeres without spines on venter or lateral margins).

The female is further characterized by the presence of a well-defined, evenly convex clypeal bevel that is shorter than the basomedian area (Fig. 212a), clypeal lip not emarginate laterally, and presence of only three apical tergal fasciae. Females of other species are similar, but *lindbergi* can be recognized, with some difficulty, by its relatively sparse mesopleural punctures (more than one diameter apart at mesopleuron center). In most other species, these punctures are no more than one diameter apart, mostly less. The mesopleural punctures are also sparse in the southern African *aterrimus* which, however, has the frons either coriaceous or a sparsely punctate and a flat middle clypeal section, with an ill-defined bevel. In *lindbergi*, the frons is punctate, with punctures about one diameter apart and interspaces varying from unsculptured to conspicuously microsculptured.

The male can be recognized by the sculpture and proportions of the clypeal middle section (Fig. 212b) which has a short bevel, an evenly arcuate, not widened mesally lip, a well-defined but nonprominent lip corner (corners equidistant from each other and the adjacent orbit or closer to orbit), and the clypeal midline less than the distance between the lip corners, at least minimally so. Subsidiary recognition features are: forebasitarsus at most with one preapical rake spine, postocellar area narrow (width about 1.3–1.4 × length), and distal volsellar portion without setae (Fig. 212c).

Description.— Scutal punctures well defined, averaging about one to about two diameters apart on disk. Mesopleural punctures varying from large to minute (many females), more than one diameter apart (several diameters apart in many specimens, but about one diameter apart in some males); interspaces at least slightly microsculptured. Propodeal dorsum varying from irregularly ridged longitudinally to finely rugose; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae (numbers in parentheses represent setal length expressed as fractions of basal mandibular width): erect on each side of oral fossa next to occipital carina (0.4), erect on postocellar area (0.3–0.4) and on scutum anteriorly (0.2–0.3); inclined anterad on propodeal dorsum.

Head and thorax black, mandible reddish preapically. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal and subcostal veins of forewing dark brown. Legs and gaster black. Terga I–III in female, I–IV in male, silvery fasciate apically.

♀.— Clypeus (Fig. 212a): bevel shorter than basomedian area (only slightly so in some specimens); lip free margin arcuate, not incised laterally. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 2.0–2.3 × apical width. Dorsal foretibial surface with one or two spines; outer surface with one spine that is located near midlength. Forebasitarsus with six or seven rake spines. Apical depression of tergum V asetose. Pygidial plate finely microsculptured and with sparse punctures. Length 8.5–9.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 212b): bevel shorter than basomedian area; lip free margin arcuate, with well-defined, somewhat prominent corner; corners equidistant from each other and from respective orbit or closer to orbit. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 1.4–1.5 × apical width, equal to about 0.7 of flagellomere II. Forefemoral notch with microscopically setose bottom. Outer margin of forebasitarsus without preapical spines or with one or two such spines (which are located near tarsomere's

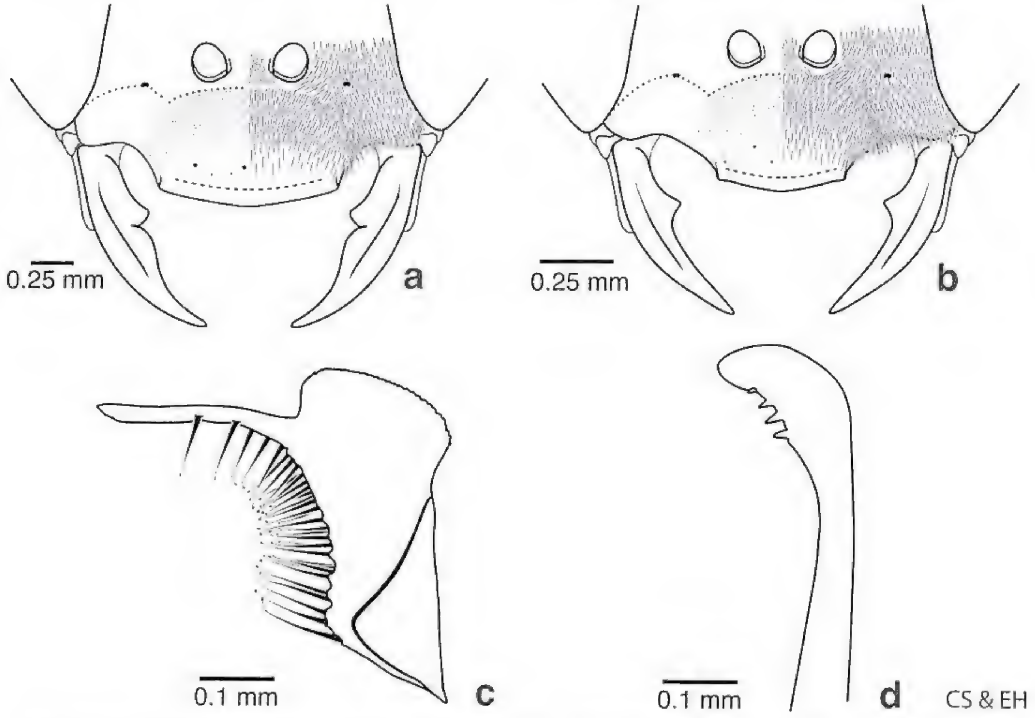


FIGURE 212. *Tachysphex lindbergi* de Beaumont; a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

base); outer apical spine of foretarsomere II shorter than tarsomere III. Length 6.6–7.5 mm. Volsella and penis valve: Figs. 212c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 213).— Madeira and Cape Verde Islands.

RECORDS.— CAPE VERDE ISLANDS (from Simon Thomas and Wiering, 1993, or as indicated): **Boavista**: Fundo de Figueiras (de Beaumont, 1956). **Fogo** (de Beaumont, 1956): Chã de Caldeiras, São Felipe.

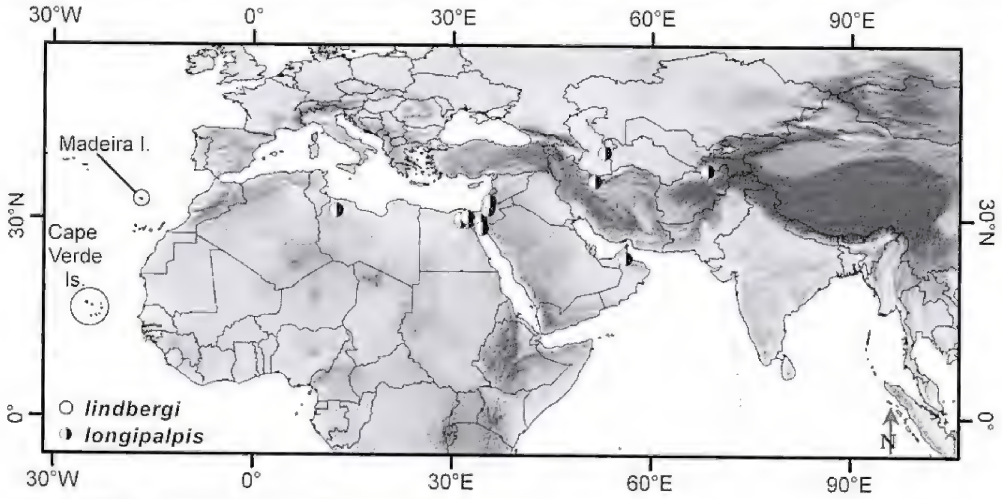


FIGURE 213. Collecting localities of *Tachysphex lindbergi* and *longipalpis*.

Maio: Porto Inglez (de Beaumont, 1956). **Sal**: Praia do Monte Grande (de Beaumont, 1956), Salinas de Pedra da Lume (1 ♀; 4 ♀, 1 ♂, ZMAN), airport to Santa Maria NW Algodoeiro. **Santo Antão**: Chã de Morte (de Beaumont, 1956), Cova (1 ♀, ZMAN). **São Tiago**: Aguada (2 ♀, ZMAN), Chã de Vaca (2 ♀; 24 ♀, 2 ♂, ZMAN), Cidade Velha (2 ♀, ZMAN), Moia-Moia (1 ♂, ZMAN), Praia (1 ♀), San Martinho Grande (2 ♀, ZMAN), São Jorge (7 ♀, 6 ♂; 27 ♀, 27 ♂, ZMAN), Serrado (4 ♀, ZMAN), Tarrafal. **São Vincente**: Mindelo (1 ♀, ZMAN), Porto Grande (Pulawski, 1976). **MADEIRA**: Fontes (Smit, 2000), Pico di Arieiro (Pulawski, 1971; Erlandsson, 1978), Ponta de Pargo (Smit, 2000).

Tachysphex longipalpis de Beaumont

Figures 213, 214.

Tachysphex longipalpis de Beaumont, 1940b:166, ♀, ♂. Holotype: ♀, Egypt: Ghiza (originally A. Alfieri collection, now USNM), examined.— Honoré, 1942:56 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:160 (in revision of Egyptian *Tachysphex*); Pulawski, 1964:83 (Egypt), 1971:299 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:274 (listed); Kazenas, 1978b:112, 125 (in key to Sphecidae of Kazakhstan and Central Asia); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia).

Tachysphex longipalpis simplex Pulawski, 1971:302, ♀, ♂. Holotype: ♂, Turkmenistan: Krasnovodsk (ZIN), examined before 1971.— de Beaumont, Bytinski-Salz, and Pulawski, 1973:10 (Israel); Bohart and Menke, 1976:274 (listed); Kazenas, 2001:30 and 31 (in checklist of Sphecidae of Kazakhstan and Central Asia).

Recognition.— *Tachysphex longipalpis* has a convex labrum, markedly protruding beyond clypeal free margin, a uniformly microsculptured mesopleuron and propodeal side, and the gaster and legs all or largely red. In addition, the setae are appressed on the postocellar area and scutum. The female differs from other such species in having the forefemoral venter (at least in the basal half) and midfemoral posteroventral surface with large, sparse, ill-defined punctures and only a few setae, the hindfemoral venter asetose (except in some Asian specimens), the wing membrane nearly hyaline. The male can be recognized by its short foretarsal rake (outer apical spine of foretarsomere II at most slightly longer than foretarsomere III), nonfasciate terga (at most with ill-defined, golden fasciae on terga I–IV) in combination with a low, rounded dorsal volsellar process (Figs. 214d, e). *Tachysphex aemulus*, *gracilicornis*, and *socotrae* are externally similar, but they have a narrow, elongate dorsal volsellar process.

In the African specimens, the galea is longer than in any other *Tachysphex*, exceeding the palpi (Fig. 214a), and in the male the forefemur is asetose between the notch and apex, a subsidiary recognition feature.

Description.— Labrum markedly convex, markedly protruding from beneath clypeus. Galea at least slightly longer than scape (see Subspecies below), with minute but well-defined punctures, most of which are no more than one diameter apart. Scutal punctures shallow, about one diameter apart or less. Mesopleuron uniformly microsculptured. Propodeal dorsum and side evenly microsculptured. Hindwing vein cu-a varying: both ends equidistant from wing base or anal end further away than cubital end. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum; erect, about as long as midocellar diameter on each side of oral fossa next to occipital carina; on propodeal dorsum oriented obliquely anterad near base, toward midline near midlength, and obliquely posterad near apex (lateral setae oriented laterad); in female fully concealing mesopleural sculpture. Hindfemoral venter asetose from base to apex except in some Asian specimens.

Head and thorax black, but the following are yellowish red: mandible (except apically), clypeal bevel and lip, and labrum. Frontal setae silvery in female, golden in male. Wing membrane hyaline in female, in male infumate (markedly so in some males, slightly so along apical margin in others);

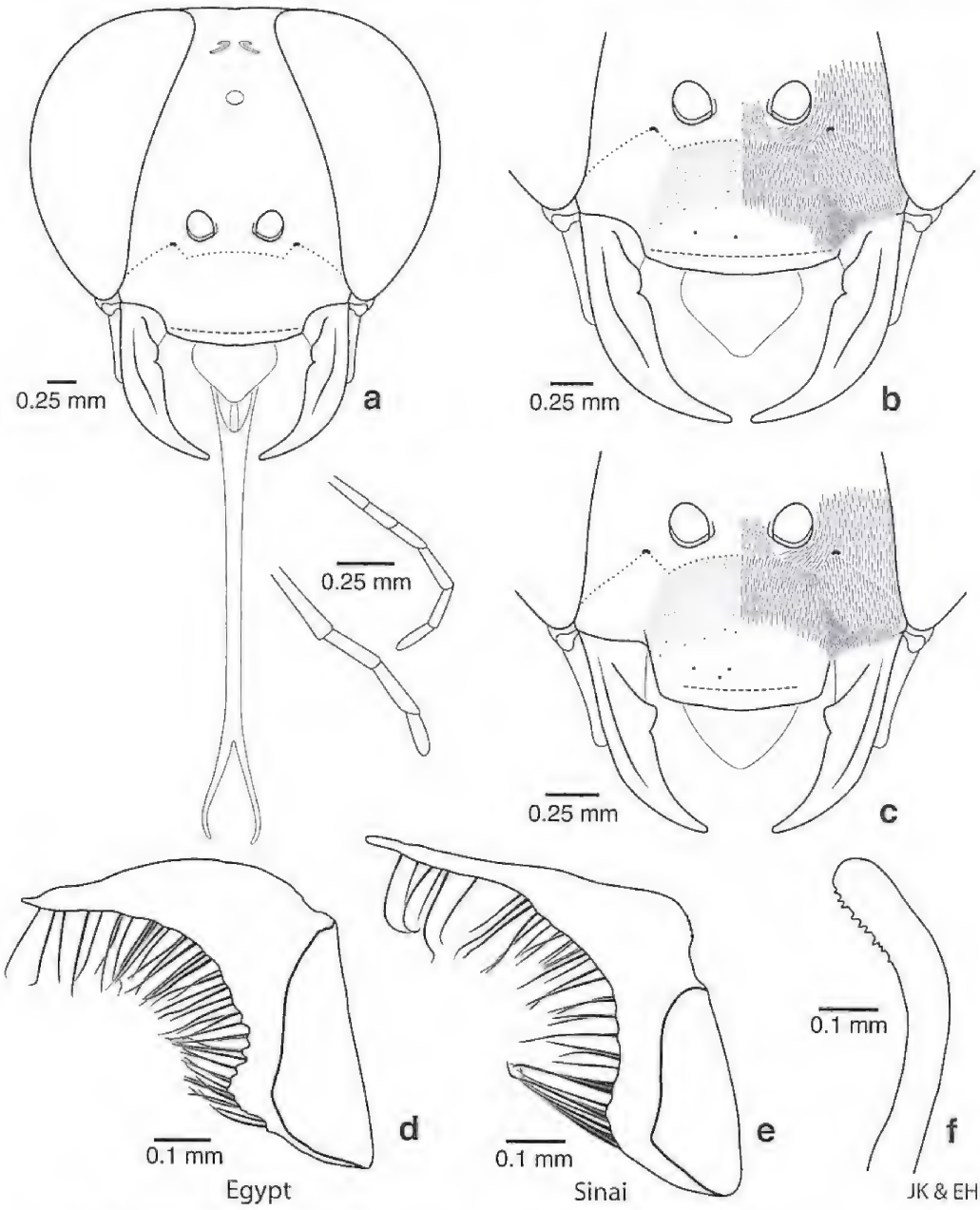


FIGURE 214. *Tachysphex longipalpis* de Beaumont; a – female head in frontal view and maxillary and labial palpus; b – female clypeus and mandible; c – male clypeus and mandible; d and e – volsella; f – penis valve.

costal and subcostal vein of forewing reddish brown or subcostal vein brown. Femora, tibiae, and tarsi red or fore- and midfemoral dorsum black basally. Gaster red or male terga V and VI black. Terga not fasciate or terga I–IV with ill-defined, inconspicuous fasciae that are silvery in female, golden in male.

♀.— Clypeus (Fig. 214b): bevel shorter to longer than basomedian area; lip free margin arcuate (emarginate mesally in specimens from Israel), not incised nor sinuous laterally. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 3.2–3.4 × apical width. Midtrochanteral venter impunctate and glabrous except for a few, sparse punctures (also hindtrochanteral venter in Egyptian specimens). Forefemoral posteroventral surface, in basal half to two thirds, asetose and with a few, sparse, ill-defined punctures. Midfemoral venter and posteroventral surface asetose, with shallow, large punctures that average several diameters apart. Dorsal foretibial surface with two or three spines; outer surface asetose, glabrous, with two spines. Forebasitarsus with 8–10 rake spines. Apical spines of hindtarsomere IV reaching claw bases or nearly so. Apical depression of tergum V (of terga III–V in many specimens) impunctate, glabrous. Pygidial plate with punctures that average several diameters apart, interspaces microsculptured to unsculptured. Length 12.0–14.0 mm.

♂.— Mandible: trimmal carina with obtuse tooth and at least rudimentary cleft. Clypeus (Fig. 214c): bevel about as long as basomedian area; lip with well-defined corner; free margin and distance between corners varying (see Subspecies below). Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.4–3.2 × apical width. Forefemoral notch smaller than average for the genus, with bottom microscopically setose. Outer margin of forebasitarsus with one or two preapical rake spines in African and 1–3 in Asian populations; outer apical spine of foretarsomere II varying in length (see Subspecies). Hindfemoral venter with inner (= posterior) margin well defined in distal half. Tergum VII with punctures several diameters apart in African, 1–2 to several diameters apart in Asian specimens. Apical depressions of sterna II–V asetose in African, setose in most Asian specimens. Length 8.1–11.1 mm. Volsella and penis valve: Figs. 214d-f.

SUBSPECIES.— Pulawski (1971) recognized *longipalpis longipalpis* for African populations and *longipalpis simplex* for those from Asia. Because they do not intergrade in their diagnostic characters, I think now that they may be two vicariant species, but possibly overlapping in the Sinai Peninsula (the closest collecting localities, Wadi Hagul southwest of Suez and Wadi Ghaib in the Sinai Peninsula are no more than 250 km apart as the crow flies). Because of my limited material, I prefer to maintain the current subspecies status of *simplex*. The two taxa differ as follows:

Character	*longipalpis longipalpis*	*longipalpis simplex*
Galea	extending beyond maxillary palpi; as long as 1.5–1.8 of scape in female, as 2.0 of scape in male	not extending beyond maxillary palpi; as long as 1.2 of scape
Male clypeus	lip free margin almost straight, not emarginate; distance between its corners 1.3–1.4 × distance between corner and orbit; carina arising from corner extends onto bevel	lip free margin obtusely pointed, emarginate mesally; distance between its corners 0.8–1.0 × distance between corner and orbit; carina arising from corner not extends onto bevel
Male forefemur	asetose between notch and apex	setose throughout
Male foretibia	outer surface asetose	setose throughout
Male foretarsomere II	outer apical spine shorter than tarsomere III	outer apical spine as long as or slightly longer than tarsomere III
Volsella	dorsal margin not emarginate	dorsal margin emarginate between projection and proximal margin

GEOGRAPHIC DISTRIBUTION (Fig. 213).— Libya, Egypt, Israel, Arabian Peninsula, Iran, Turkmenistan, Tajikistan.

RECORDS (from Pulawski, 1971, if not indicated otherwise).— **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash, Ghiza (1 ♀, 3 ♂). **As Suways** (= Suez): Fayed, Wadi Hagul 30 km SW Suez (1 ♀). **Sina** (= Sinai): Wadi Ghaib 50 km SSW Nuweiba (4 ♂). **Location unknown**: Choubrah, El Timid. **IRAN**: **Teheran**: Sokhe-Hissar. **ISRAEL**: En Gedi (1 ♂), 5 km S Jericho, Masada (1 ♂). **LIBYA**: **Tripolitania**: Bir el Hamra. **OMAN**: Wadi Agran (1 ♂, KMG). **TAJIKISTAN**: Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TURKMENISTAN**: Krasnovodsk.

Tachysphex longipes Pulawski, sp. nov.

Figures 211, 215, 216.

DERIVATION OF NAME.— *Longipes*, Latin for long-legged, with reference to the elongate tarsi of this species.

RECOGNITION.— *Tachysphex longipes*, an all black species found only in the Namib Desert, has a flat labrum and a galea shorter than wide in profile, hindwing crossvein cu-a vertical, and the apical tarsomeres without spines on the venter or along the lateral margins. It also has a conspicuously wide postocellar area (Figs. 215a, b), a conspicuously punctate scutum and mesopleuron (mesopleural punctures slightly compressed against each other in the female, interspaces dull), the setae erect and sinuous on the postocellar area, lower gena, and thorax, and the male clypeal lobe is sharply pointed. Several species are similar, but *longipes* has distinctive, elongate mid- and hindtarsi (Figs. 215g, h); e.g., the length of hindtarsomere IV is 1.7 × apical width in the female and 1.6–1.8 × in the male. The flagellum is also unusually long, about as in *fugax* (e.g., length of flagellomere IV 4.0–4.3 × times width in female and about 2.0 in male).

Subsidiary recognition features of *longipes* are as follows. In the female, the postocellar area is concave (Fig. 215a), and the setae are suberect on the hindfemoral venter (Fig. 215e). In the male, the flagellum is uniformly sculptured, sternum VIII evenly emarginate, and setae of the hindfemoral venter are suberect basally, although less distinctly so than in the female (Fig. 215f).

DESCRIPTION.— Mandible: outer ridge somewhat swollen and expanded over notch. Frons dull, punctatorugose. Scutal punctures conspicuous, less than one diameter apart (a few discal punctures one diameter apart or more in some specimens). Mesopleural punctures conspicuous, somewhat compressed against each other in female. Some punctures of mesothoracic venter up to about two diameters apart. Propodeal dorsum irregularly ridged longitudinally, side ridged. Hindcoxal dorsum with inner margin carinate, carina minimally expanded basally. Midtrochanteral venter shiny, all or largely impunctate. Tarsi elongate, basal portion of mid- and hindtarsomeres IV (from base to dorsoapical emargination) longer than emargination itself (Figs. 215g, h).

Setae erect or suberect and sinuous on postocellar area, lower gena, thorax, fore- and midfemoral venters; not concealing integument; hindfemoral venter with suberect setae that become shorter toward apex (all setae appressed in apical half or third in male). Setal length, expressed as a fraction of basal mandibular width, about 0.8 on postocellar area and next to hypostomal carina, about 0.6 on midfemoral venter in female and about 0.3 in male; setae of hindfemoral venter up to 0.6 in female and 0.2–0.3 in male.

Head, thorax, gaster, and legs black (including tarsi), but mandible with reddish preapical zone. Frontal setae silvery in both sexes. Wing membrane nearly hyaline; forewing costal vein light brown, subcostal vein contrastingly dark brown. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 215c): middle section markedly convex, bevel about as long as basomedian area; lip free margin arcuate or somewhat sinuous (irregularly undulate in some specimens), not incised laterally. Width of postocellar area 2.0–2.4 × length (Fig. 215a). Dorsal length of flagello-

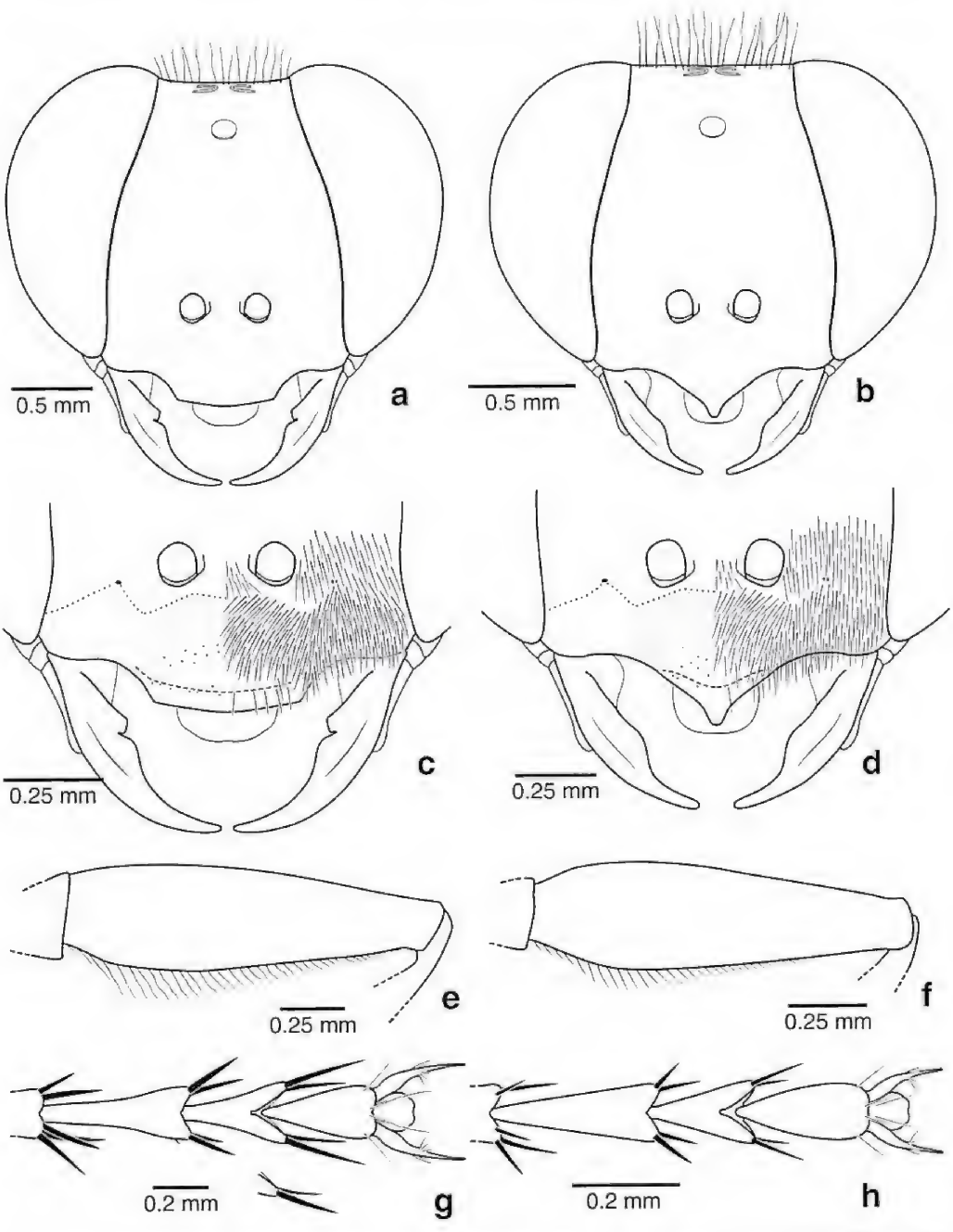


FIGURE 215. *Tachysphex longipes* Pulawski, sp. nov.: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – female hindfemur; f – male hindfemur; g – female hindtarsomeres III–V; h – male hindtarsomeres III–V.

mere I 3.0–3.5 × apical width. Forefemoral venter with small, ill-defined punctures that average several diameters apart. Dorsal foretibial surface with one or two spines; outer surface with one or two spines. Forebasitarsus with five or six rake spines. Length of hindtarsomere III about 3.0 × apical width, that of hindtarsomere IV about 1.7 × apical width (Fig. 215g). Apical depression of tergum V setose (setae absent in worn specimens). Length 7.0–9.0 mm.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 215d): middle section markedly convex, with obtuse, markedly oblique carina (nearly parallel to clypeal free margin) that emerges from clypeal midpoint; bevel longer mesally than basomedian area; lip free margin sharply pointed, without corner (i.e., clypeal free margin forming single curved line from midpoint to orbit). Width of postocellar area 2.8–2.9 × length (Fig. 215b). Dorsal length of flagellomere I about 1.5 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with three or four rake spines; outer apical spine of foretarsomere II as long as tarsomere III or slightly shorter. Apical width of hindtarsomere III about 2.2 × apical width, that of hindtarsomere IV about 1.6–1.8 × apical width (Fig. 215h). Length 5.8–6.4 mm. Volsella and penis valve: Fig. 216.

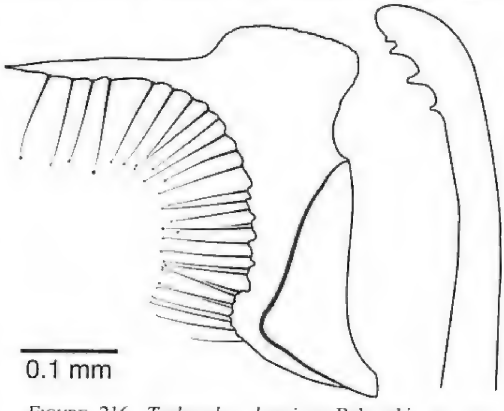


FIGURE 216. *Tachysphex longipes* Pulawski, sp. nov.: volsella and penis valve.

FLORAL RECORDS.— The specimens from 110 km NW Swakopmund were collected on flowers of *Psilocaulon salicornioides* (Pax) Schwantes, those from 113 km NW Swakopmund on flowers of *Brownanthus kuntzei* (Schinz) Ihlenf, as recorded by F.W. and S.K. Gess, the collectors. Both plant species are members of Aizoaceae.

GEOGRAPHIC DISTRIBUTION (Fig. 211).— Namibia (Namib Desert only).

RECORDS.— HOLOTYPE: ♀ **NAMIBIA**: **Karibib District**: 55 km SW Usakos, 1 Mar 1990, WJP (CAS). PARATYPES: **NAMIBIA**: **Karibib District**: 65 km SW Usakos, 1 Mar 1990, WJP (2 ♀), MS (5 ♀; 10 ♀, 2 ♂, MS). **Khorixas District**: Uis [Myn], Feb 1978, C. Kok and S.J. van Tonder (1 ♀, PPRI). **Swakopmund District**: 20 km NE Hentiesbaai, 10 Dec 1996, WJP (2 ♀, 6 ♂), 33 km NW Hentiesbaai, 8 Dec 1996, WJP (1 ♂); Homeb 10 km ESE Gobabeb, 23–25 Jan 1972, [British Museum] Southern African Expedition (1 ♀, BMNH); Kuiseb, date illegible, H. Dick Brown (1 ♀, BMNH); Kuiseb River in Namib/Naukluft National Park near Gobabeb, 20 Mar 1993, Natl. Coll. Kuiseb Survey (1 ♀, 2 ♂, PPRI); 15 km E Swakopmund, 8 Feb 1992, J. Gusenleitner (1 ♂, JG); 10 km N Swakopmund, 6 Dec 1996, WJP (1 ♂); 110 km NNW Swakopmund, 15 Mar 1999, FSG (4 ♂, AMG); 113 km NNW Swakopmund, 18 Mar 2000, FSG (12 ♂, AMG); Swartrand 20 mi W Gobabeb, 5 Oct 1967, E.S. Ross and A.R. Stephen (1 ♀). **Walvis Bay District**: 16 mi SE Rooibank, 1 Jan 1967, E.S. Ross and K. Lorenzen (1 ♀); 11 km E Walvis Bay, 7 Dec 1996, WJP (1 ♂).

Tachysphex luctuosus Arnold, new status

Figures 217, 218.

Tachysphex schoenlandi var. *luctuosus* Arnold, 1924:69, ♂. Holotype: ♂, South Africa: Eastern Cape Province: Willowmore (TMP), examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex schoenlandi luctuosus*: Bohart and Menke, 1976:276 (new status, listed).

RECOGNITION.— *Tachysphex luctuosus* has the labrum slightly convex and slightly protruding beyond the clypeal free margin, galea longer than wide in profile, punctures well defined on the scu-

tum and mesopleuron, propodeal side ridged and posterior surface with a well-defined median sulcus that extends to the upper margin, sternum I with a median carina but no apical depression, hindwing vein cu-a vertical, and setae appressed on the postocellar area. The female has two lateral incisions on each side of the clypeal lip, and apical tarsomeres with one or two spines on each lateral margin (except the foretarsus) and one on venter. In the male sterna II–IV each has a conspicuous, distinctive fringe of suberect, agglutinated setae on the apical margin, the forefemoral notch has no basal tuft of setae, and the forebasitarsus has no preapical rake spines. A similar type of sternal

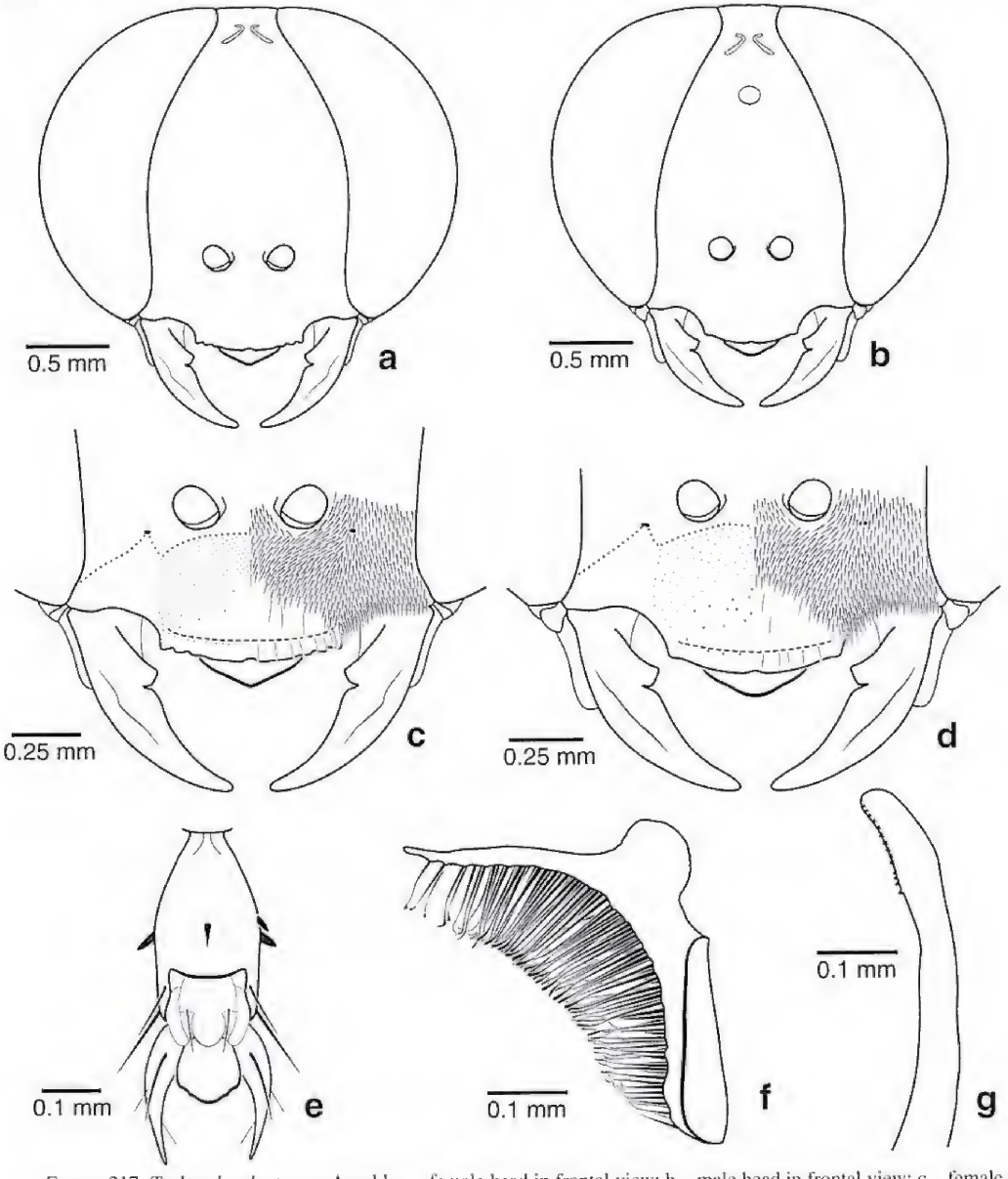


FIGURE 217. *Tachysphex luctuosus* Arnold: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – apical hindtarsomere V ventrally; f – volsella; g – penis valve.

pilosity is found in the male of *schoenlandi*, in which, however, the labrum is flat and not protruding beyond the clypeal free margin, the galea is shorter than wide, setae are erect on the postocellar area, the mesopleuron is conspicuously microsculptured and has only evanescent punctures, the median sulcus of the propodeal posterior surface does not extend to the upper margin, the forefemoral notch has a basal tuft of setae, forebasitarsus has 3–5 rake spines, and vein cu-a is oblique in most specimens.

Description.— Labrum slightly convex, somewhat protruding beyond clypeal margin. Galea in profile markedly longer than wide, as long as of scape. Scutal punctures well defined, averaging about one diameter apart. Mesopleural punctures well defined, averaging slightly more than one diameter apart near center. Many punctures of mesothoracic venter, in male, up to two or three diameters apart. Propodeal dorsum rugose, in most specimens with tendency to form longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I without apical depression, with longitudinal carina.

Setae nearly appressed on postocellar area and scutum, oriented posterad on propodeal dorsum. Longest setae of lower gena about 0.3 of basal mandibular width.

Head and thorax black, mandible reddish except apically. Frontal setae with golden tinge in female, golden in male (clypeal setae silvery). Wing membrane nearly hyaline; costal vein of forewing reddish, subcostal vein brown. Femora black except apex red, tibiae and tarsi red. Gastral segments I, II, and small portion of III red in female and some males, partly to nearly all black in other males, remaining segments black. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 217c): bevel shorter than basomedian area; lip free margin arcuate, minimally emarginate mesally, with two small lateral incisions on each side. Width of postocellar area 0.7–0.8 × length (Fig. 217a). Dorsal length of flagellomere I 1.7 × apical width. Dorsal foretibial surface with one or two spines; outer surface with one spine near midlength. Forebasitarsus with 14 rake spines (spines soft, long). Apical tarsomeres each with one central spine on venter and one or two spines near midlength on each lateral margin (Fig. 217e); lateral spines lacking on foretarsus. Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that are many diameters apart; interspaces shiny. Length 7.5–7.8 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 217d): bevel longer than basomedian area; lip free margin arcuate, with rudimentary emargination mesally and well-defined corner; distance between corners 1.6 × distance between corner and orbit. Width of postocellar area 0.6–0.7 × length (Fig. 218b). Dorsal length of flagellomere I 1.2–1.4 × apical width. Forefemoral notch microscopically setose, relatively small. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Tarsomeres V with or without preapical spine on venter. Tergum VII, near middle, with punctures that are several diameters apart. Apical depressions of sterna II and III fully concealed by appressed setae; apical margin of sterna II–IV each with suberect fringe of agglutinated setae. Sterna IV–VI with impunctate, shiny swelling anterad of apical depressions. Sternum VIII: hindmargin nearly straight mesally.

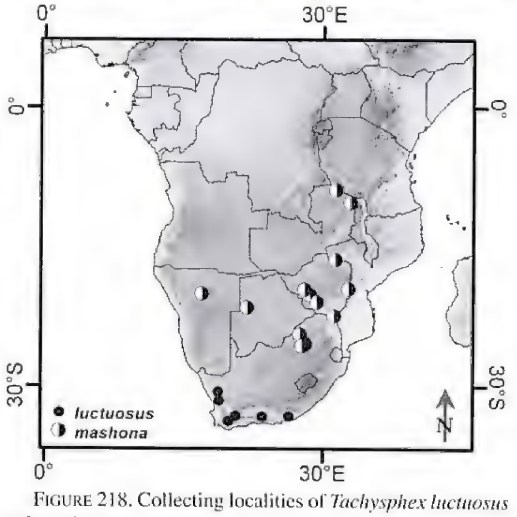


FIGURE 218. Collecting localities of *Tachysphex luctuosus* and *mashona*.

Length 6.8–7.3 mm. Volsella and penis valve: Figs. 217f, g.

Geographic distribution (Fig. 218).— Southern South Africa.

Records.— SOUTH AFRICA: Eastern Cape Province: 18 km WNW Grahamstown: Hilton Farm (1 ♀), Willowmore (1 ♂, TMP, holotype of *luctuosus*). **Western Cape Province**: Kliprand 60 km WNW Loeriesfontein (1 ♂, OÖLM), Matjiesfontein (1 ♂), 5 km W Robertson (2 ♂), 10 km E Vanrhynsdorp (1 ♀).

Tachysphex luxuriosus Morice

Figures 211, 219.

Tachysphex luxuriosus Morice, 1897:307, ♀. Holotype: ♀, Egypt: Koubbah near Cairo (OXUM), examined in 1974.— de Beaumont, 1940:167 (in revision of Egyptian *Tachysphex*; ♂ = *Tachysphex inextricabilis*); Honoré, 1942:56 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:169 (in revision of Egyptian *Tachysphex*; ♂ = *Tachysphex inextricabilis*), 1956a:197 (Libya), 1960b:238 (Libya); Pulawski, 1964:94 (Egypt; redescription; ♂ = *Tachysphex inextricabilis*); Osborn and Krombein, 1969:16 (NW Sudan); Pulawski, 1971:351 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Bohart and Menke, 1976:274 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

As *Tachysphex horus* (♂ only), corrected to *Tachysphex luxuriosus* by Pulawski, 1971:351: de Beaumont, 1940:168 (Egypt, revision), 1947a:171 (in revision of Egyptian *Tachysphex*), 1956a:197 (Libya).

Tachysphex seth Pulawski, 1964, ♀, ♂ (♀ = *Tachysphex inextricabilis*). Holotype: ♂: Egypt: Al Fayyum Province: Kom Osheim (CAS), examined. Synonymized with *Tachysphex luxuriosus* by Pulawski, 1971:351.

Recognition.— *Tachysphex luxuriosus* shares the following unique combination with *geniculatus*, *horus*, *inextricabilis*, and *niloticus*: labrum markedly convex and protruding beyond the clypeal lip; postocellar area unusually broad (width at least twice length); female mandible with unusually broad, widely open cleft (see Fig. 161c), female clypeus with lip conspicuously emarginate laterally (see Fig. 161c), and male forefemur not emarginate. In addition, the mesopleuron is coriaceous (integument concealed by vestiture in some species), setae are short on the postocellar area (no longer than one midocellar diameter), and appressed on tergum I.

Like *inextricabilis*, *luxuriosus* has the scutal hindcorner (Fig. 219a) roundly prominent (non-prominent in *geniculatus*, *horus*, and *niloticus*) and the propodeal side setose throughout (propodeal side glabrous adjacent to metapleural sulcus in the other three species). Also, *luxuriosus* and *inextricabilis* have the setae appressed on the postocellar area, and in fresh females the integument is completely concealed by vestiture on the frons, scutum, and mesopleuron. In the female of *luxurio-*

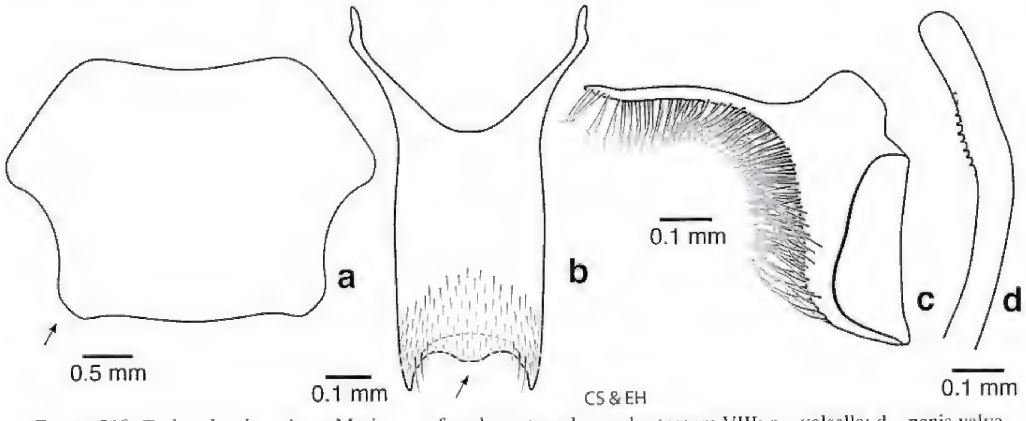


Figure 219. *Tachysphex luxuriosus* Morice: a – female scutum; b – male sternum VIII; c – volsella; d – penis valve.

sus, however, the lateral carina of the pygidial plate is evanescent (at least in the apical quarter or so), whereas it is obtuse but well defined in *inextricabilis*. The males differ in the shape of sternum VIII (compare Figs. 219b and 193a) and of the volsella (Figs. 219c and 193b): the apical margin of the latter is either roundly prominent mesally or evenly concave in *luxuriosus*, while the median prominence is emarginate in *inextricabilis*. The following characters help in identification: in most *luxuriosus*, the mesothoracic venter is sparsely punctate anterad of each midcoxa (punctures several to many diameters apart), and the outer apical spine of male foretarsomere II is about as long as tarsomeres III and IV combined. In *inextricabilis*, the mesothoracic venter is densely punctate (punctures less than one to slightly more than one diameter apart), and the outer apical spine of male foretarsomere II is about as long as tarsomere III.

Sex association.— My association of sexes in *luxuriosus* and *inextricabilis* is based on the specimens from Kom Osheim, Egypt (where both species were collected simultaneously). In these populations, the mesothoracic venter is sparsely punctate in the former species, and densely punctate in the latter, without intergradation.

Similar unassigned specimen.— The single female from Niger (30 km S Agadez at 16°39.0′N 7°56.9′E) shares the characters of both *luxuriosus* and *inextricabilis*: the lateral carina of the pygidial plate is well defined (as in *inextricabilis*), but the mesothoracic venter is sparsely punctate (as in many *luxuriosus*).

Description (see also Variation below).— Labrum convex, conspicuously protruding beyond clypeal free margin. Galea with punctures several diameters apart (about one diameter apart anteriorly), as long as 0.9 of scape in female, 1.1 of scape in male. Supraantennal swelling largely covered by vestiture. Scutal hindcorner roundly prominent (Fig. 219a), scutal flange broadening posterad; scutal punctures well defined, about one diameter apart in female, up to about two diameters apart on disk in male. Mesopleuron coriaceous, dull. Mesothoracic venter: see Variation below. Propodeal dorsum conspicuously microsculptured, dull, with ill-defined, longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum, fully concealing integument of frons, scutum, and mesopleuron in fresh females; erect on each side of oral fossa next to occipital carina, equal to 0.4 of basal mandibular width; variously oriented on propodeal dorsum; suberect in distal half of midfemoral venter in male and many females; propodeal side setose throughout. Sternum I all or largely asetose.

Head and thorax black but the following are yellowish red: mandible (except apically), labrum, clypeal lip and bevel (bevel nearly all black in some males), also scapal venter in female. Frontal setae silvery in both sexes, except upper frons with golden tinge in males from Marsa Matruh area. Wing membrane hyaline; costal vein of forewing light brown, subcostal vein reddish brown. Color of legs: see below. Gaster red in female, in male red basally, with three or four apical segments brown. Terga I–V silvery fasciate apically, also tergum VI laterally with silvery setae in male.

♀.— Mandible: cleft unusually broad, widely open (as in Fig. 161c). Clypeus (as in Fig. 161c): bevel about as long as basomedian area, delimited anterolaterally by inconspicuous carina that emerges from lip corner; lip free margin straight or shallowly concave mesally, roundly emarginate laterally. Width of postocellar area 2.0–2.3 × length. Dorsal length of flagellomere I 2.1–2.5 × apical width. Forefemoral base, on anteroventral surface, with a few large punctures that are many diameters apart. Dorsal foretibial surface with three or four spines; outer surface with two or three spines. Forebasitarsus with 7–9 (mostly eight) rake spines. Midtrochanteral venter unsculptured except for a few, sparse punctures. Venters of tarsomeres V each with thin, preapical spine. Apical depression of tergum V partly asetose. Pygidial plate with minute punctures that average many diameters apart, interspaces unsculptured, lateral carina evanescent (only in apical quarter or so in

a female from Kassala, Sudan). Length 9.0–12.5 mm. Legs red except coxae black in many specimens and femoral base black in some.

♂.— Mandible: trimmal carina obtusely angulate, but without tooth or cleft. Clypeus (as in Fig. 161c): bevel about as long as basomedian area; lip free margin evenly, inconspicuously arcuate, corner obtuse, ill defined; distance between corners about 1.2 × distance between corner and orbit. Width of postocellar area 2.1–2.7 × length. Dorsal length of flagellomere I 1.7–1.9 × apical width. Forefemur not emarginate. Foretarsal rake: see Variation below. Venters of tarsomeres V each with thin, preapical spine. Sternum VIII: bottom of apical emargination roundly expanded mesally (Fig. 219b) in most specimens, evenly concave in some. Length 6.5–10.0 mm. Volsella and penis valve: Figs. 219c, d. Femora black except apically, hindfemur red in some specimens; tibiae red or hindtibia darkened; tarsi red.

VARIATION.— Most specimens are characterized by the following: punctures of the mesothoracic venter, anterad of the midcoxa, are many diameters apart in the female and 2–3 to several diameters apart in the male (about one diameter apart anteriorly and adjacent to the midline); the male forebasitarsus has five or six rake spines, and the outer apical spine of foretarsomere II is as long as tarsomeres III and IV combined or slightly shorter; the penis valve is the same diameter throughout (Fig. 219d).

The males collected 64 km W Marsa Matruh, Egypt, are significantly different, but I treat them as conspecific with *luxuriosus* because of their identical volsella. In these specimens, the mesothoracic venter varies from densely punctate (punctures less than one diameter apart) to sparsely punctate (punctures 2–3 diameters apart anterad of each midcoxa); foretarsomere I has 1–3 rake spines, and the outer apical spine of foretarsomere II is shorter than tarsomere III; the penis valve has a slightly concave apicoventral portion, similar to that of *inextricabilis* (Fig. 193c).

COLLECTING PERIOD.— 9 April through 10 August.

GEOGRAPHIC DISTRIBUTION (Fig. 211).— Egypt, Libya, Sudan, and Israel.

RECORDS.— **EGYPT**: **Al-Bahr-al-Ahmar**: Wadi Mellaha (Pulawski, 1971). **Al Fayyum**: Kom Osheim (11 ♀, 7 ♂). **Al Jizah** (= Ghiza): Dahshur (1 ♂). **Al Qahirah** (= Cairo): Helwan (de Beaumont, 1940), Kubbah (Morice, 1897), Maadi (1 ♀). **Aswan**: Aswan, west bank (1 ♂). **Matruh**: NW Bahariya oasis at 29°17′53″N 28°16′53″E (1 ♀, AMNH), 64 km W Marsa Matruh (14 ♂; 1 ♂, MSNT). **Sina** (= Sinai): no specific locality (Roche and Zalat, 1994). **ISRAEL**: Jericho (de Beaumont, Bytinski-Salz, and Pulawski, 1973). **LIBYA** (de Beaumont, 1956a, 1960b): **Cyrenaica**: Baltet er Ramla. **Fezzan**: Oum el Araneb. **Southeastern Libya**: Sarra Well at 21°34′N 21°55′E. **Tripolitania:** Ben Giauad near Nofilia, Garian. **SUDAN**: Kassala (1 ♀, GENOVA, determined as *rufiventris* by P. Magretti), Wadi Ain el Brins in Gebel 'Uweinat at 21°50′N 25°05′E (1 ♂).

Tachysphex marshalli R. Turner

Figures 220–223.

Tachysphex marshalli R. Turner, 1917d:293, ♀, ♂. Lectotype: ♀, Zimbabwe: Salisbury, now Harare (BMNH), **here designated**, examined.— Arnold, 1923:149 (original description copied), 1930:2 (listed); Bohart and Menke, 1976:274 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Schistosphex breijeri Arnold, 1922:137, ♀. Holotype: ♀, South Africa: Kraaifontein [probably Kraalfontein] in former Transvaal, location of locality unknown (TMP), examined. **New synonym.**— Arnold, 1930:2 (listed).— As *Tachysphex breijeri*: Menke *in* Bohart and Menke, 1976:271 (pygidial plate illustrated), 272 (new combination, listed).

Tachysphex marshalli var. *terrificus* Arnold, 1935:497, ♀. Holotype: ♀, Botswana: Kaotwe (TMP), examined. **New synonym.**— As *Tachysphex marshalli terrificus*: Bohart and Menke, 1976:274 (new status, listed).

RECOGNITION.— *Tachysphex marshalli* has a distinctive coloration (Fig. 220): wings all black,

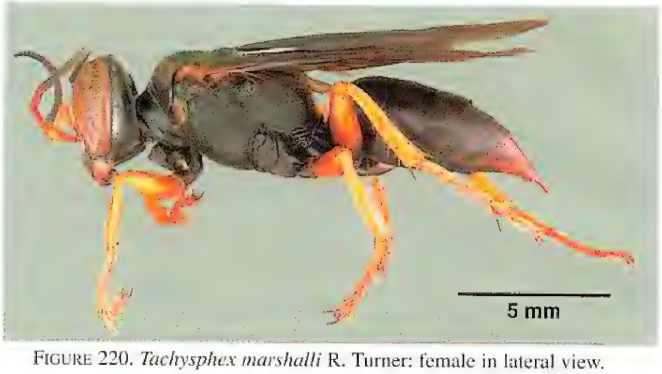


FIGURE 220. *Tachysphex marshalli* R. Turner: female in lateral view.

with a conspicuous violet shine; gaster all or predominantly black, with nonfasciate terga; and at least some tibia and tarsus contrastingly red. The female foretarsomere I is unique: concave, unsculptured (shiny), and glabrous along the outer margin, at least in the basal two thirds. Other significant features are: trochanteral as well as fore- and midfemoral venters shiny, with large, sparse punctures (male forefemur sparsely punctate and shiny posteroventrally except in basal half); mesopleural setae brown, nearly erect, longer than midocellar diameter (Fig. 221c); propodeal side ridged (ridges evanescent in some specimens); and dorsal length of male flagellomere I 2.7–2.8 × apical width. The femoral and propodeal features are shared with *punctatus* and *quadricolor*, which also lack tergal fasciae. Their color patterns, however, are different, the mesopleural setae are subappressed under the scrobe (but nearly erect in many Ethiopian *quadricolor* in which the wings are conspicuously bicolored), and the female foretarsus is finely punctate throughout. See these species for further differences (pp. 518 and 524).

JUSTIFICATION OF NEW SYNONYMY.— The holotype of *Schistosphex breijeri* is a typical female of *marshalli* except for its pygidial plate deeply emarginate apically, clearly a teratological feature. The holotype of *Tachysphex marshalli* var. *terrificus* is just a female color form with an all black gaster.

DESCRIPTION.— Labrum mostly convex anteriorly (but less so than in *panzeri* or *pentheri*), practically flat in some males, protruding or not protruding beyond clypeal free margin. Galea sparsely punctate, longer than wide in profile, about as long as 0.6 of scape in female, 0.8 in male. Scutal punctures averaging 1–2 diameters apart, but many punctures several diameters apart in some specimens. Mesopleuron dull, uniformly microsculptured in some specimens, shallowly punctate in others. Episternal sulcus complete or incomplete. Propodeal dorsum irregularly ridged to uniformly microsculptured; side ridged or ridges evanescent. Hindwing vein cu-a varying: both ends equidistant from wing base or anal end further away than cubital end. Hindcoxal dorsum with inner margin carinate, carina not expanded basally.

Setae erect, about 0.3 × basal mandibular width, on each side of oral fossa next to occipital carina; suberect, shorter than midocellar diameter on postocellar area; practically erect, about as long as midocellar diameter on scutum anteriorly; suberect, slightly longer than midocellar diameter on mesopleuron (Fig. 221c); oriented obliquely posterad on propodeal dorsum (dorsum glabrous apicomesally in most specimens).

Head and thorax black but mandible yellowish red (except apically); clypeus black or bevel and lip reddish; antennae black or scape, pedicel, and flagellomeres I and II red. Frontal vestiture golden in both sexes except dark brown in single female from Namibia. Thoracic setae dark. Wing membrane black, with conspicuous violet shine. Femora varying from red to black, tibiae and tarsi red, but fore- and midlegs black in single ♀ from Gemsbok Pan, Botswana, and hindtibiae black in Tanzanian males. Gaster black or female pygidial plate and male segments VI and VII red; terga I and II, in a ♂ from Newington, South Africa, each with reddish spot near center, also tergum III with such spot in a ♂ from Algoa Bay, both South Africa. Terga without silvery, apical fasciae.

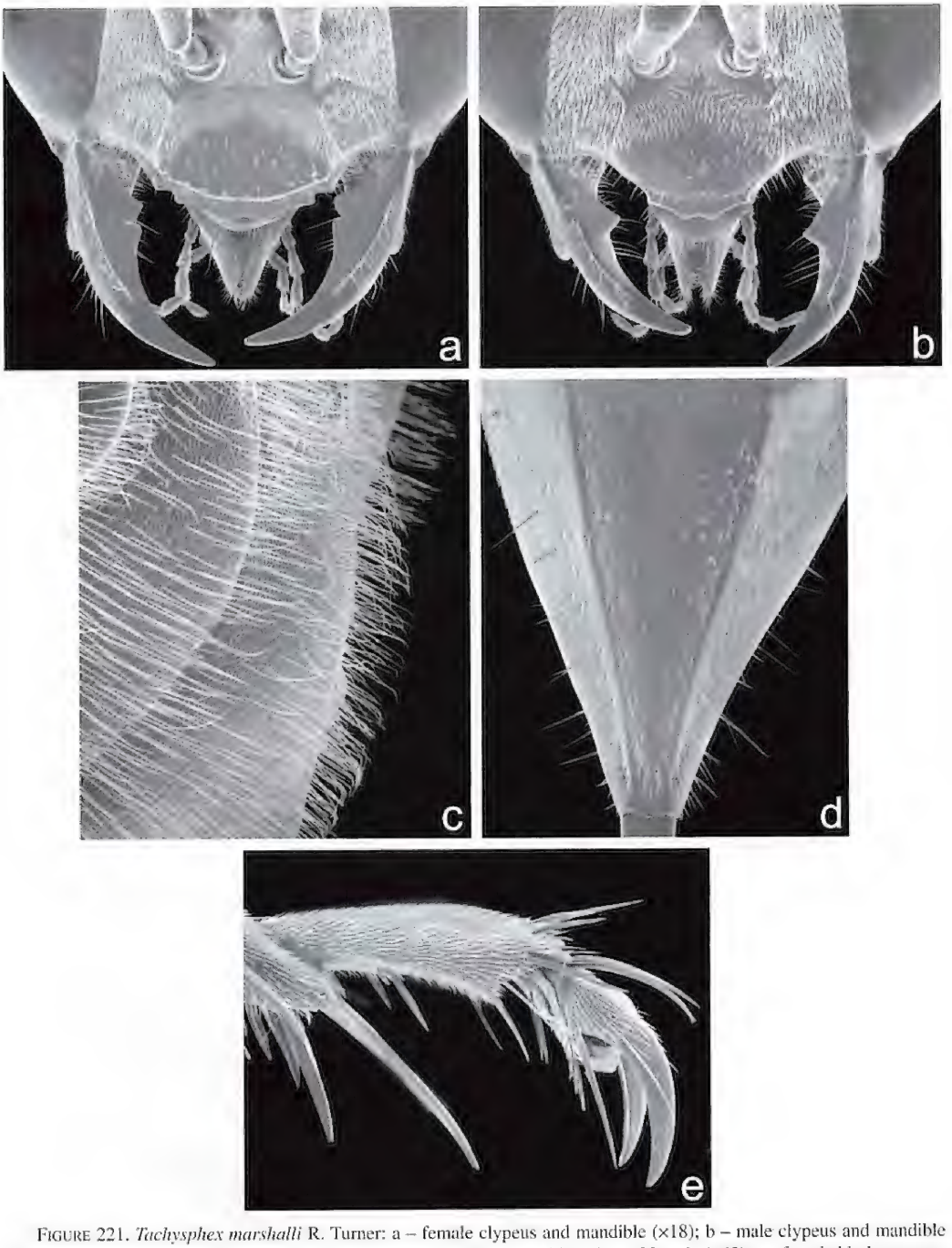


FIGURE 221. *Tachysphex marshalli* R. Turner: a – female clypeus and mandible (×18); b – male clypeus and mandible (×24); c – mesopleuron in front view showing erect setae (×60); d – pygidial plate of female (×42); e – female hindtarsomere V in lateral view (×54).

♀.— Clypeus (Fig. 221a): lobe markedly prominent, bevel longer than basomedian area, irregularly punctate; lip emarginate mesally in many specimens, free margin straight or shallowly concave on each side of emargination, laterally broadly sinuous or incised. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.8–3.0 × apical width. Venters of all trochanters and of all femora shiny, with large, sparse punctures (also posterior face of midfemur). Dorsal foretibial surface with two or three spines; outer surface impunctate, glabrous, shiny, with a few spines. Midtibial dorsum impunctate and glabrous between spines. Hindtibia punctate and setose throughout or (most specimens) dorsum impunctate, glabrous. Forebasitarsus concave and asetose along outer margin (only in basal two thirds in single female from Willowmore, South Africa), with eight or nine rake spines. Apical tarsomeres with several thin spines on venter, including a pair of basal spines (Fig. 221e). Tergum V punctate and setose throughout. Pygidial plate unusually narrow, elongate, microsculptured, sparsely punctate (Fig. 221e). Length 14.8–20.0 mm.

♂.— Mandible: trimmal carina with prominent tooth, without cleft. Clypeus (Fig. 221b): bevel markedly longer mesally than basomedian area; lip free margin arcuate (emarginate mesally in some specimens), with well-defined, somewhat prominent corner; distance between corners 0.6–0.8 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.7–2.8 × apical width. Forefemoral notch asetose, margined both anteriorly and posteriorly. The following are glabrous, with scattered punctures: trochanteral venters, posterior surface of forefemur (except basal half), posterior surface and venter of midfemur, and hindfemoral venter (punctures large except fine on hindfemur). Outer margin of forebasitarsus with 4–7 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Most sternal setae suberect, about 1.5 × midocellar diameter on apical sterna. Length 9.0–15.0 mm. Volsella and penis valve: Fig. 222.

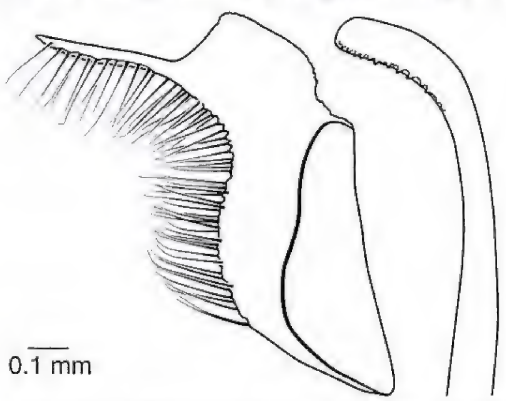


FIGURE 222. *Tachysphex marshalli* R. Turner: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 223).— Angola and Zambia to South Africa.

RECORDS.— ANGOLA: Pediva 30 mi E Porto Alexandre (1 ♀; 3 ♂, BMNH). **BOTSWANA**: Damara Pan (1 ♂, TMP), Gemsbok Pan (1 ♀, paratype of *marshalli terrificus*, TMP), 18 mi NE Kalkfontein (2 ♂, BMNH), Kaotwe (1 ♀, TMP, holotype of *marshalli terrificus* Arnold). **MOZAMBIQUE**: Maputo: Rikatla (1 ♀, ZMAN), Nhacoongo (1 ♀, UST), Salone at 18°10′S 35°47′E (1 ♀, SAM). **NAMIBIA**: **Karasburg District**: Fish River Canyon 18 km E Ai Ais at 27°57′03″S 17°32′35″E (1 ♀, CSE). **Keetmanshoop District**: Noachabeb [Farm] 100 km SSE Keetmanshoop (1 ♂, NMN), Rotegab 90 km SSE Keetmanshoop (1 ♂, NMN). **Maltahöhe District**: 5 km E Maltahöhe (1 ♀).

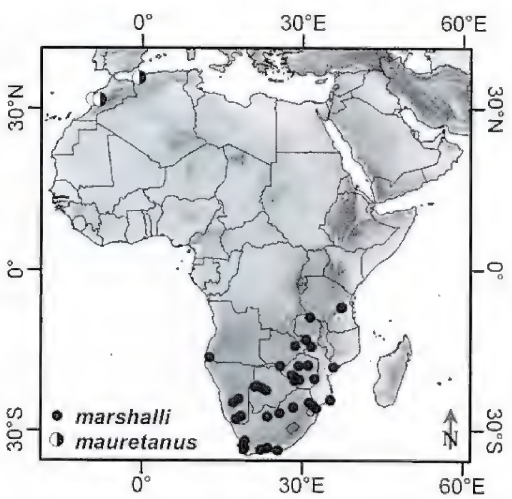


FIGURE 223. Collecting localities of *Tachysphex marshalli* and *mauretanus*.

♀.— Clypeus (Fig. 221a): lobe markedly prominent, bevel longer than basomedian area, irregularly punctate; lip emarginate mesally in many specimens, free margin straight or shallowly concave on each side of emargination, laterally broadly sinuous or incised. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.8–3.0 × apical width. Venters of all trochanters and of all femora shiny, with large, sparse punctures (also posterior face of midfemur). Dorsal foretibial surface with two or three spines; outer surface impunctate, glabrous, shiny, with a few spines. Midtibial dorsum impunctate and glabrous between spines. Hindtibia punctate and setose throughout or (most specimens) dorsum impunctate, glabrous. Forebasitarsus concave and asetose along outer margin (only in basal two thirds in single female from Willowmore, South Africa), with eight or nine rake spines. Apical tarsomeres with several thin spines on venter, including a pair of basal spines (Fig. 221e). Tergum V punctate and setose throughout. Pygidial plate unusually narrow, elongate, microsculptured, sparsely punctate (Fig. 221e). Length 14.8–20.0 mm.

♂.— Mandible: trimmal carina with prominent tooth, without cleft. Clypeus (Fig. 221b): bevel markedly longer mesally than basomedian area; lip free margin arcuate (emarginate mesally in some specimens), with well-defined, somewhat prominent corner; distance between corners 0.6–0.8 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.7–2.8 × apical width. Forefemoral notch asetose, margined both anteriorly and posteriorly. The following are glabrous, with scattered punctures: trochanteral venters, posterior surface of forefemur (except basal half), posterior surface and venter of midfemur, and hindfemoral venter (punctures large except fine on hindfemur). Outer margin of forebasitarsus with 4–7 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Most sternal setae suberect, about 1.5 × midocellar diameter on apical sterna. Length 9.0–15.0 mm. Volsella and penis valve: Fig. 222.

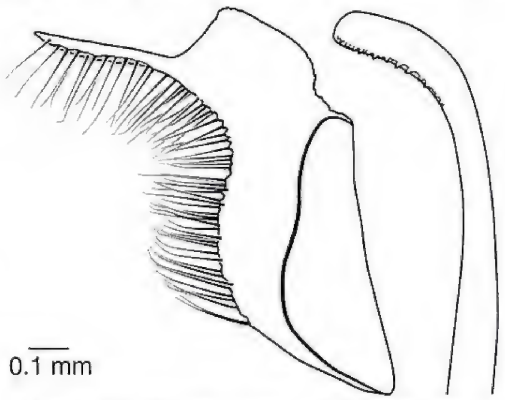


FIGURE 222. *Tachysphex marshalli* R. Turner: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 223).— Angola and Zambia to South Africa.

RECORDS.— **ANGOLA**: Pediva 30 mi E Porto Alexandre (1 ♀; 3 ♂, BMNH). **BOTSWANA**: Damara Pan (1 ♂, TMP), Gemsbok Pan (1 ♀, paratype of *marshalli terrificus*, TMP), 18 mi NE Kalkfontein (2 ♂, BMNH), Kaotwe (1 ♀, TMP, holotype of *marshalli terrificus* Arnold). **MOZAMBIQUE**: Maputo: Rikatla (1 ♀, ZMAN), Nhacoongo (1 ♀, UST), Salone at 18°10′S 35°47′E (1 ♀, SAM). **NAMIBIA**: **Karasburg District**: Fish River Canyon 18 km E Ai Ais at 27°57′03″S 17°32′35″E (1 ♀, CSE). **Keetmanshoop District**: Noachabeb [Farm] 100 km SSE Keetmanshoop (1 ♂, NMN), Rotegab 90 km SSE Keetmanshoop (1 ♂, NMN). **Maltahöhe District**: 5 km E Maltahöhe (1 ♀).

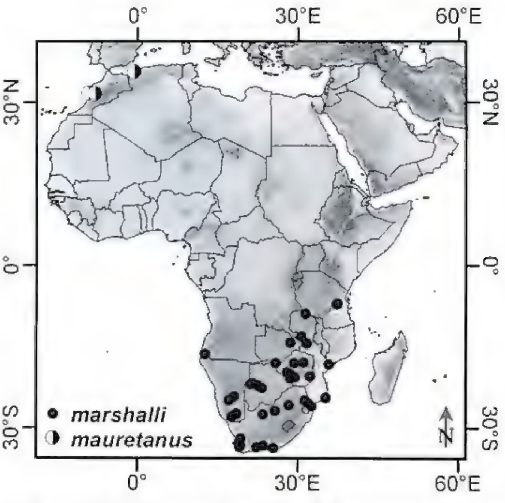


FIGURE 223. Collecting localities of *Tachysphex marshalli* and *mauretanus*.

Mariental District: Onze Rust 192 [Farm] (1 ♂, AMG). **SOUTH AFRICA**: **Eastern Cape Province**: Uitenhage (1 ♂, SAM), Willowmore (1 ♀, TMP). **Gauteng**: Pretoria: Brummeria (1 ♂, PPRI), NE Tswaing District (1 ♂, TMP). **Mpumalanga**: Crocodile Bridge in Kruger National Park (1 ♂; 1 ♀, PPRI). **Northern Cape Province**: Kuruman (1 ♂, TMP), Newington (1 ♂, AMG). **Western Cape Province**: Citrusdal District (1 ♀, SAM), 26 km ENE Clanwilliam at 32°03′30″S 19°07′15″E (1 ♂), Doringbos at 31°58′19″S 19°13′33″E (1 ♂, CSE), Oudtshoorn: Onverwacht at 33°37′S 22°14′E (1 ♀, AMG), Roode Sands Mts. near Tulbagh (1 ♂, SAM), Wellington: Rooshoek (1 ♂, RMNH). **Location unknown**: Kraaifontein in the former Transvaal according to Arnold, 1922:137 [probably Kraalfontein, either at 24°02′S 29°39′E or 23°26′S 29°20′E] (1 ♀, TMP, holotype of *Schistosphex breijeri*); it may be a farm's name according to F.W. Gess, pers. comm.). **TANZANIA**: **Morogoro Region**: 48 km W Morogoro (3 ♂), 60 road km SW Morogoro (1 ♂), 62 road km SW Morogoro (5 ♂). **ZAMBIA**: **Central Province:** 25 km SSW Kapiri Mposhi (1 ♂). **Eastern Province:** 32 km E Petauke (1 ♂). **Northern Province**: Mbala (1 ♀, SAM), 65 road km NE Serenje (1 ♂). **ZIMBABWE**: Bulawayo (1 ♀, 3 ♂, SAM), Bulawayo airport (6 ♂), Bulawayo: Forestvale (1 ♂, SAM), Bulawayo: Hillside (1 ♀, 2 ♂, SAM), Filabusi: Druid Mine (1 ♂, SAM), Harare (1 ♀, 1 ♂, BMNH, lectotype and paralectotype of *marshalli*), Kami Ruins (2 ♀, 4 ♂; 2 ♂, NHMZ), Matobo National Park: Old Gwanda Road (1 ♀), Redbank (1 ♂, SAM), Sabi River (1 ♀, 2 ♂, SAM), Sanyati Valley (1 ♂, SAM), Sawmills (1 ♂, SAM), Victoria Falls (1 ♂, SAM).

Tachysphex mashona Arnold, new status

Figures 218, 224.

Tachysphex oberon var. *mashona* Arnold, 1929c:387, ♀. Holotype: ♀, Zimbabwe: Penkridge (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex oberon mashona*: Bohart and Menke, 1976:275 (new status, listed).

Tachysphex oberon var. *halophilus* Arnold, 1940:120, ♀. Holotype: ♀, South Africa: Gauteng: Saltpan, now Tswaing (TMP), examined. **New synonym.**— As *Tachysphex oberon halophilus*: Bohart and Menke, 1976:275 (new status, listed).

TYPE LOCALITY.— The type locality of *halophilus* is Saltpan (now Tswaing), which Arnold (1940) incorrectly placed in Kalahari rather than near Pretoria. The type label reads "Saltpan, Pto.", the last word being an abbreviation for Pretoria.

RECOGNITION.— *Tachysphex mashona* can be recognized by the structure of its lower frons (Fig. 224c): the supraantennal swelling is markedly enlarged and fused with the antennal socket rim (but not higher than the latter); and the socket rim is conspicuously higher dorsally than ventrally. Subsidiary recognition features are: setae oriented posterad on propodeal dorsum (except oriented anterad basomedially) and gastral terga I–IV (I–V in male) silvery fasciate apically. In the female, the length of midtarsomere II is 1.4 × apical width, and the pygidial plate is densely punctate and apically emarginate (Fig. 224d). In the male, the dorsal length of flagellomere I is 2.5–2.7 × the apical width, the femora are largely red, tibiae and gastral segments I–III all red, and sterna IV and V glabrous at least basally.

JUSTIFICATION OF NEW SYNONYMY.— The holotypes of *mashona* and *halophilus* differ in details of sculpture and coloration, but the unique structure of their lower frons demonstrates that they are conspecific. These two names are therefore synonyms.

STATUS OF THE SPECIES.— Although similar to *oberon*, *mashona* is not likely to be an individual variant of the latter. These two *Tachysphex* differ in the structure of the antennal socket and supraantennal swelling, punctation of the female pygidial plate, and length of male flagellomere II. I have not observed intergradation.

DESCRIPTION (see also Variation below).— Supraantennal swelling enlarged but not higher than antennal socket, fused with the latter (Fig. 224d), its sides steep but not vertical; socket rim markedly higher dorsally than ventrally. Scutum uniformly punctate, punctures no more than one

diameter apart. Mesopleural punctures well defined (fine in female), averaging about one diameter apart near center. Propodeal dorsum evenly microareolate or minutely ridged; side finely punctate or with fine, inconspicuous ridges. Hindcoxal dorsum with inner margin carinate basally. Sternum I with obtuse median carina (carina evanescent posteriorly in single male from Otavi area, Namibia).

Setae suberect on each side of oral fossa next to occipital carina, equal to about 0.2 of basal mandibular width; erect on postocellar area, about one midocellar diameter long; appressed on scutum; suberect on mesopleuron; inclined posterad on propodeal dorsum (inclined anterad near anterior margin).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in

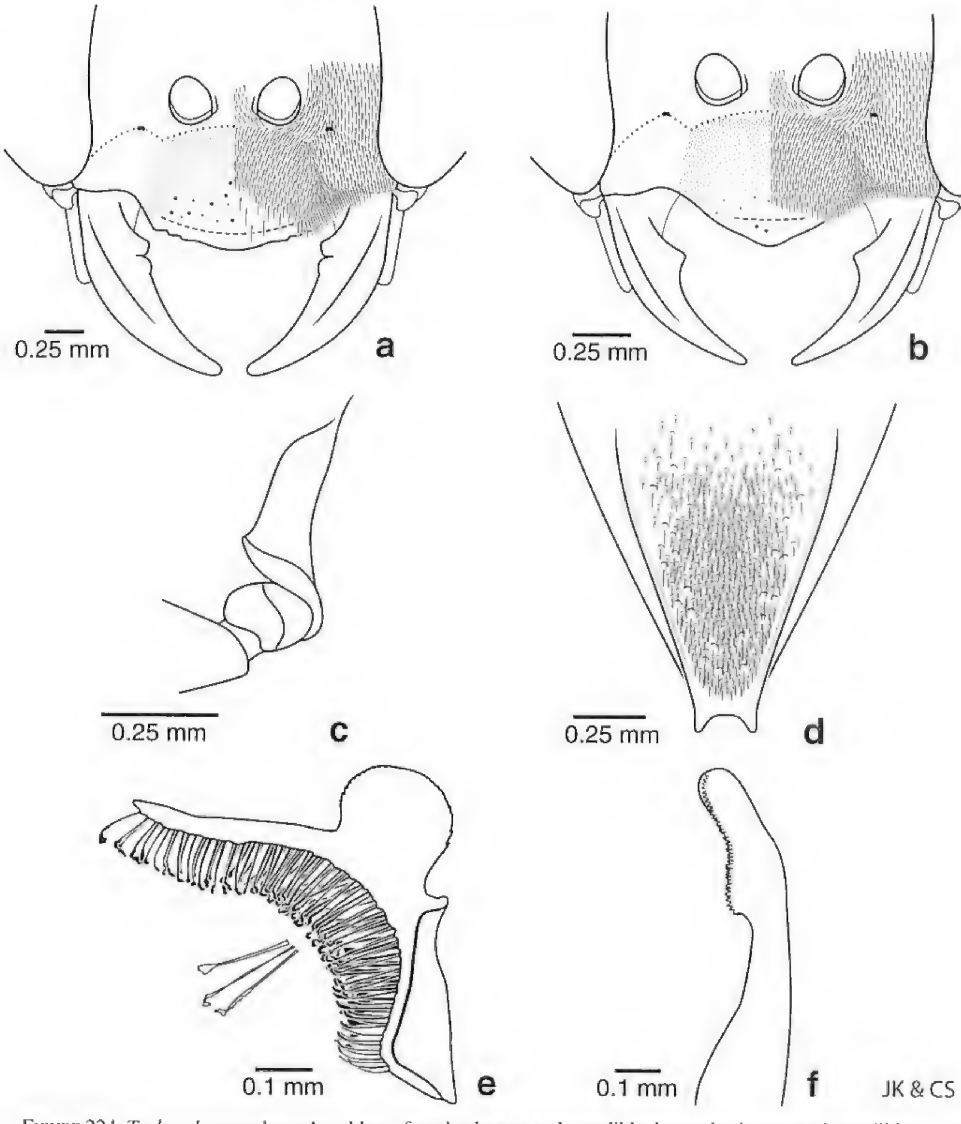


FIGURE 224. *Tachysphex mashona* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – supraantennal swelling of female; d – pygidial plate of female; e – volsella; f – penis valve.

most males, but silvery in those from Kransberg and Pafuri, South Africa. Wing membrane yellowish, forewing costal and subcostal veins light brown. Color of legs and gaster: see below. Terga I–IV in female, I–V in male, silvery fasciate apically (fasciae golden in single male from Otavi, Namibia).

♀.— Labrum shallowly emarginate. Clypeus (Fig. 224a): bevel shorter to longer than basomedian area, with sparse large punctures intermixed with dense smaller punctures; lip free margin arcuate or prominent mesally, with two lateral incisions on each side (the holotype of *mashona* has three pairs of incisions and central portion of lip reduced to a tooth). Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width. Forefemoral venter either minutely, evenly punctate (punctures several to many diameters apart, interspaces shiny) or posteroventral surface with only a few, sparse punctures (holotype of *mashona*). Dorsal foretibial surface with one or two spines; outer surface with several spines and narrow, asetose zone. Tarsi short: length of fore- and midtarsomeres II about 1.0 and 1.4 × apical width, respectively; that of midtarsomere III about 0.8 × apical width; of fore-, mid-, and hindtarsomeres IV about 0.7, 0.8, and 0.9 × apical width, respectively. Forebasitarsus with 10 or 11 rake spines. Apical depression of tergum V minutely punctate mesally and laterally. Pygidial plate densely punctate (punctures averaging less than one diameter apart), markedly incised apically (Fig. 224d). Length 9.6–12.2 mm. Femora black, tibiae black (with small reddish zones), and tarsi dark brown in specimens from most areas, but femora, tibiae, and tarsi red in those from Penkridge, Zimbabwe. Gaster black, tergum I with a pair of large, red spots in holotype of *mashona*.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 224b): bevel ill defined; lip free margin obtusely pointed, with somewhat ill-defined corner; distance between corners 0.7–0.8 × distance between corner and orbit. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomere II 1.8–1.9 × apical width, that of midtarsomere III 1.2 × apical width. Sterna III and IV setose to largely glabrous, sterna V and VI asetose (at least basally). Sternum VIII: apical margin prominent mesally. Length 9.1–11.5 mm. Volsella and penis valve: Figs. 224e, f. Legs red except fore- and midfemora black basally. Gastral segments I–III and VII red, segments IV–VI largely black.

VARIATION.— In most specimens, the interspaces between punctures are microsculptured on the scutum and mesopleuron, the propodeal side is finely ridged, the punctures on the forefemoral venter are only several diameters apart, the femora are all black, and the tibiae largely so. The two females from Penkridge, Zimbabwe, have the interspaces between punctures unsculptured and shiny on the scutum and mesopleuron, propodeal side unridged, forefemoral venter sparsely punctate (punctures many diameters apart), and the femora, tibiae, and tarsi red. I regard all these specimens as individual variants of one species because they all share the characteristic structure of the lower frons.

GEOGRAPHIC DISTRIBUTION (Fig. 218).— Zambia to Namibia and South Africa.

RECORDS.— **BOTSWANA**: Ghanzi (1 ♀, BMNH). **NAMIBIA**: **Grootfontein District**: 60 km SW Otavi (1 ♂). **SOUTH AFRICA**: **Gauteng**: Tswaing (1 ♀, TMP, holotype of *halophilus*). **Northern Province**: Kransberg 30 km N Thabazimbi at 24°25′S 27°31′E (1 ♂, PPRI), Pafuri in Kruger National Park (1 ♂, PPRI). **North-West Province**: Brits: Castle Goa at 25°38′S 27°47′E (1 ♀, AMG), **ZAMBIA**: **Northern Province**: Kasyasya 80 km E Isoka (1 ♀, RMNH), Mbala (2 ♂; 3 ♀, 4 ♂, SAM). **ZIMBABWE**: Bulawayo (2 ♂, SAM), Insiza River (2 ♀, SAM), Mavuradonha Wilderness area 15 km E Muzarabani (1 ♀ OÖLM), Penkridge (2 ♀, SAM, holotype and paratype of *mashona*), Sawmills (2 ♂, SAM).

Tachysphex mauretanus Pulawski

Figures 223, 225.

As *Tachysphex julliani* Kohl No. 2: de Beaumont, 1955a:182 (Morocco), synonymized with *Tachysphex mauretanus* by Pulawski, 1971:366.

Tachysphex mauretanus Pulawski, 1971:366, ♀, ♂. Holotype: ♂, Morocco: Marrakech (LAUSANNE), reexamined in 2004.— Bohart and Menke, 1976:274 (listed)

Recognition.— *Tachysphex mauretanus*, known from Morocco and Algeria, is one of the species in which the galea is membranous, the maxillary stipes has short, inconspicuous setae, the frons is not bulging near midlength, hindwing vein cu-a is vertical, and the length of the marginal cell is more than 3.0 × width.

In the female, in addition, the pygidial plate is broadly rounded apically, not constricted preapically, with a transverse sulcus, the integument being sparsely punctate anteriorly to the sulcus and impunctate posteriorly to it. Also, the clypeal bevel is present and the lip free margin is sinuous but not incised laterally, and the setae bordering the apical depressions of segments IV and V are thickened. Unlike *julliani*, the female of *mauretanus* has the mandibular outer ridge not expanded over the notch, and unlike *argentatus* the mesopleural vestiture is easily visible, not concealed by vestiture.

In the male, sterna IV–VI have only a few, sparse punctures mesally, and the mesopleural setae

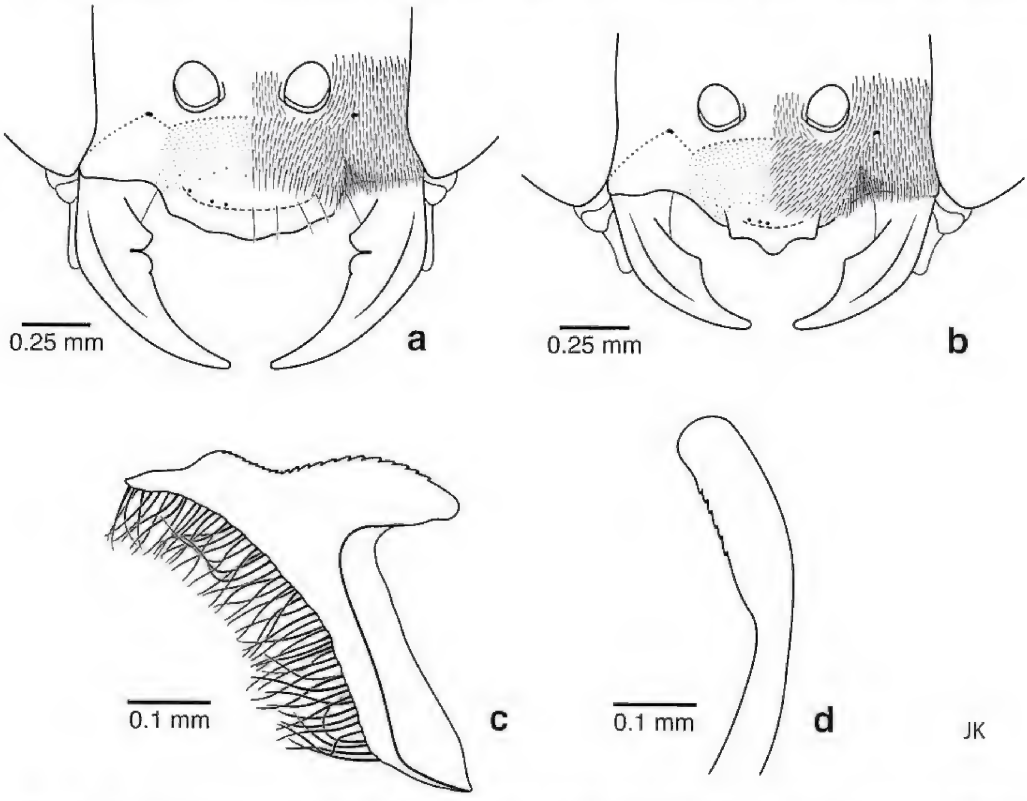


Figure 225. *Tachysphex mauretanus* Pulawski: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

do not conceal the integuments. It differs from all similar species in having a unique, markedly sinuate clypeus (Fig. 225b).

Description.— Galea membranous. Scutal punctures well defined, up to about two diameters apart on disk; interspaces unsculptured, shiny. Mesopleuron punctatorugose in female, in male with punctures that average less than one diameter apart. Punctures of mesothoracic venter up to about two diameters apart on each side of midline. Propodeal dorsum microareolate and slightly rugose; side ridged; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum with inner margin carinate basally. Sternum I obtusely carinate along midline.

Setae erect or nearly so, about as long as midocellar diameter, on each side of oral fossa next to occipital carina; appressed on postocellar area and scutum; oriented largely anterad on propodeal dorsum, but lateral setae oriented obliquely posterad and joining apicomesally.

Head and thorax black, mandible yellowish red (except apically). Frontal setae silvery in female and some males, golden dorsally in other males. Wing membrane slightly infumate; costal vein of forewing reddish brown, subcostal vein brown. Femora black except red apically, mid- and hindfemora in male varying from red to black; tibiae and tarsi red. Gastral segments I and II red (tergum II largely darkened in female), remainder black. Terga I–IV in female, I–III in male, silvery fasciate apically.

♀.— Clypeus (Fig. 225a): bevel about as long as basomedian area; lip free margin arcuate, with ill-defined, broad protuberance mesally, sinuous laterally. Width of postocellar area 0.7 × length. Dorsal length of flagellomere I 2.1 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with five rake spines. Apical tarsomeres with one preapical spine on venter. Preapical bristles of gastral segments IV and V thickened. Tergum V with a few, sparse punctures anterad of apical depression; apical depression broad, impunctate, glabrous. Pygidial plate unusually broad, with transverse sulcus, with a few sparse punctures anterad of sulcus, impunctate posterad of sulcus, aciculate preapically (as in *julliani*, see Fig. 200c). Length 7.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 225b): bevel shorter than basomedian area; lip free margin markedly sinuate, with well-defined corner; distance between corners 0.6–0.7 × distance between corner and orbit. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 1.75–1.9 × apical width. Forefemoral notch with well-defined, microscopically setose, microsculptured platform that is margined posteriorly and does not raise apically over femoral surface. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Venter of tarsomeres V with one spine near center. Tergum VII densely punctate or punctures more than one diameter apart basally. Apical depression of sternum II sparsely punctate and setose to practically impunctate, glabrous; that of sterna III and IV impunctate, glabrous (sterna punctate anterolaterally); sterna V and VI with a few, sparse punctures. Length 7.5–8.0 mm. Volsella and penis valve: Figs. 225c d.

Geographic distribution (Fig. 223).— Morocco, Algeria.

Records.— **ALGERIA**: Oran (1 ♀, LAUSANNE). **MOROCCO**: Agadir (1 ♂), Marrakech (1 ♂, LAUSANNE, holotype of *mauretanus*).

Tachysphex mediterraneus Kohl

Figures 226, 227.

Tachysphex mediterraneus Kohl, 1883a:173, ♀ (as *mediterranea*, incorrect original termination). Lectotype: ♀, Italy: Sicilia: Valsavoja, now Lentini Diramazione (NHMW), designated by Dollfuss, 1989:13, examined.— Kohl, 1885:371 (in revision of Larrini), 1893:32 (Austria); Dalla Torre, 1897:681 (in catalog of world Hymenoptera); Ferton, 1901a:99 (Corsica, nest and prey); Antiga and Bofill, 1904:11 (in catalog of Catalonian Hymenoptera); Ferton, 1908:558 (Corsica, nest and prey); Mercet, 1910:165 (listed from Spain); Morice, 1911:101 (Algeria); Ferton, 1912:388 and 398 (Algeria, nest and prey); Adlerz, 1916:110 (review of nesting habits); Ferton, 1923:128, 171, and 315 (nesting habits); Berland, 1925:118 (in Sphecid Fauna of France); Grandi, 1930:316 (nesting habits, description of ♂) and 341 (Italy), 1934:61 (nesting), 129 (Italy), 1935:110 (Italy); de Beaumont, 1936a:210 (in revision of French *Tachysphex*, description of ♂); Guiglia, 1937:333 (Italy); Giner Marí, 1943:137 (in revision of Spanish Sphecidae); de Beaumont, 1947b:393 (Cyprus); de Andrade, 1949:15 (Portugal); Pittioni, 1950:25 (Cyprus); de Beaumont, 1953a:175 (Mauritania), 1954a:58 (Italy), 1954b:91 (Italy); Grandi, 1954:239 (Italy); de Beaumont, 1955:183 (Morocco); Bytinski-Salz, 1956:226 (Turkey); Ceballos, 1956:376 (listed from Spain); Morel, Nouvel, and Ribaut, 1956:339 (France); Bajári, 1957a:135 (Hungary), 1957b:50 and 54 (in key to Hungarian Sphecidae); Nouvel and Ribaut, 1958:13 (France); Pulawski, 1958a:181 (Bulgaria); Diniz, 1959:29 (Portugal); de Beaumont, 1960a:18 (Greece: Island of Rhodes); Grandi, 1961:199 (life history); de Beaumont, 1962b:26 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Diniz, 1964:29 (Portugal); Pulawski, 1964:95 (Egypt); de Beaumont, 1965:48 (Greece); Roberti, Frilli, and Pizzaghi, 1965:110 (Italy); Balthasar, Hrubant, and Hrubant, 1967:171 (Bulgaria); Pulawski, 1967a:401 (Turkey); Königsmann, 1971:106 (Spain); Pulawski, 1971:255 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:9 (Israel); Erlandsson, 1974:72 (Italy, Yugoslavia); Bohart and Menke, 1976:274 (listed); Gheorghiou, 1977:192 (Cyprus); Kazenas, 1978:116, 127 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:216, 220 (in key to Sphecidae of European USSR); Dollfuss, 1983b:10 (reference to Kohl, 1893); Gayubo, 1984a:85 (Spain); Józan, 1985b:57 (reference to Bajári, 1957), 83 (ecological and zoogeographic characteristics); Gayubo, 1986a:33 (Spain); Gayubo and Sanza, 1986:46 (Spain); Gayubo and Tormos, 1986:17 (Spain); Gayubo, 1987:113 (Spain); Asís and Jiménez, 1988:272 (Spain); Dollfuss, 1988:12 (reference to Kohl, 1883a); Gayubo and Mingo, 1988:80 (Spain); Dollfuss, 1989:13 (lectotype in NHMW); Pagliano, 1990:104 (in catalog of Italian Sphecidae); Gayubo, Borsato, and Osella, 1991:402 (Italy); Negrisolo, 1991:318 (Italy); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Gayubo and Borsato, 1994:208 (Italy); Krombein and Pulawski, 1994:11 (summary of life history), 41 (in revision of Sri Lankan *Tachysphex*); Tormos, Asís, and Gayubo, 1994:188, 205 (Spain); Negrisolo, 1995:23 (Italy); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Minoranskiy and Shkuratov, 1996:81 (Russia: Rostov Oblast'); González, Gayubo, and Torres, 1998:72, 73 (Spain); Gayubo, García, Torres, and González, 1999:90 (Spain); Shkuratov, 2000:58 (Russia: Rostov Oblast'), 2001:17 (prey); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia), 158 (review of known biology); Kazenas and Esenbekova, 2001:134 (Kazakhstan); Schmidt and Bitsch *in* Bitsch et al., 2001:256 (in Sphecid Fauna of Western Europe); Gayubo, González, and Torres, 2002:184 (Spain); Kazenas, 2002a:70 (Kazakhstan); Shkuratov, 2002:141 (Russia: Rostov Oblast'); Generani, Pagliano, Scaramozzino, and Strumia, 2003:65 (Italy); Nieves-Aldrey et al., 2003:42 (Spain); Pagliano, 2003:131 (Italy); Gayubo et al. 2004:131 (Spain); Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004:108 (Spain); Cruz-Sánchez et al., 2005:220 (Spain).

Tachysphex collaris Kohl, 1898:100, ♀. Syntypes: ♀, Waboniland, now Kenya: Coast Province: no specific locality (NHMW), examined before 1971. Synonymized with *Tachysphex mediterraneus* by Pulawski *in* Krombein and Pulawski, 1994:41.— Arnold, 1923:175 (listed), 177 (original description translated into English), 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex mediterraneus collaris*: Pulawski, 1971:257 (new status); Bohart and Menke, 1976:274 (listed); Dollfuss, 1989:13 (types in NHMW).

Tachysphex lanatus Arnold, 1947:151, ♀, ♂. Lectotype: ♀, Northern Rhodesia: Abercorn, now Zambia: Mbala

(SAM), **here designated**, examined. Synonymized with *Tachysphex mediterraneus* by Pulawski *in* Krombein and Pulawski, 1994:41.— Bohart and Menke, 1976:274 (listed).

LECTOTYPE SELECTION.— A female and a male were designated as types of *lanatus* by Arnold. I have selected the female as the lectotype, and the male as the paralectotype.

RECOGNITION.— *Tachysphex mediterraneus* has a black body, hindcoxal dorsum expanded into a tooth near its anterior end (as in Fig. 262a), and setae sinuous, suberect or erect on the head (Figs. 226a, b) and thorax (longest setae are about equal to the basal mandibular width). The female has a unique clypeus, with the lip free margin forming a median, obtuse tooth and two or three teeth on each side (Fig. 226c). In the male, the lobe is narrow, with corners markedly closer to each other than to orbits (Fig. 226d), although the corners are fully reduced in some specimens. Males of several other species are similar, but they lack a tooth on the hindcoxal dorsum. The mesopleuron is rugose in many, but not all *mediterraneus* (both females and males), a subsidiary recognition feature.

DESCRIPTION.— Scutal punctures well defined, nearly contiguous to several diameters apart on disk (integument punctatorugose near margins in some specimens). Mesopleuron varying: all rugose, or partly punctate (only episcrobal area rugose in individuals from Zimbabwe and South Africa), or all punctate (e.g., in some females from Kenya, unique females from Andara, Namibia, Mfuwe area, Zambia, one from Zanzibar, and one from Harare, Zimbabwe). Propodeal dorsum rugose, side ridged. Hindcoxal dorsum with inner margin conspicuously angulate basally.

Setae sinuous and suberect to erect on head (Figs. 226a, b) and thorax (longest setae about equal to basal mandibular width), not concealing integument, erect or somewhat inclined posterad on propodeal dorsum.

Head, thorax, legs, and gaster black except apical tarsomeres brown, in female pygidial plate red apically in most specimens, all red in those from Tanzania (including Zanzibar), and in several females from Ethiopia, Ivory Coast, Kenya, Tunisia, and Zambia, and male tergum VII red in Tanzanian specimens (segments V–VII red in some). Frontal setae silvery in both sexes, but golden in some Tanzanian males. Wing membrane hyaline; forewing costal vein light brown to black, subcostal vein dark brown to black. Terga I–III or I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 226c); bevel varying from nearly reduced to longer than basomedian area; free margin of lip with obtuse, median point and three teeth on each side (only two teeth in female from Andara, Namibia; with two teeth on one side and three on the other in a specimen from Mtito Andei area, Kenya), teeth separated by incisions. Width of postocellar area 1.2–1.9 × length (Fig. 226a). Dorsal length of flagellomere I 2.1–2.4 × apical width. Forefemoral venter shiny, with minute punctures that are several to many diameters apart. Dorsal foretibial surface with several minute, suberect bristles; outer surface with one spine or seta near midlength and one near apex. Forebasitarsus with 7–9 rake spines (six in the smallest specimen examined). Length of hindtarsomere IV equal to apical width, emargination rectangular. Tarsomeres V in most specimens without spines on venter or lateral margin but with one small preapical spine on venter and two small spines on each lateral margin in some African individuals. Claws somewhat expanded dorsally near midlength, with straight, thin apical half. Apical depression of tergum V impunctate, glabrous (except punctate and setose mesally in some specimens). Pygidial plate sparsely punctate, unsculptured between punctures, apically rounded to nearly truncate and relatively broad (Fig. 226e). Length 6.5–11.0 mm.

♂.— Mandible: trimmal carina with tooth, with or without cleft. Clypeus (Fig. 226d): bevel ill defined; free margin of lip either sinuate, with well-defined corner, or roundly pointed, without corner (then forming single curved line with rest of clypeal margin); distance between corners about 0.6 × distance between corner and adjacent orbit. Width of postocellar area 1.3–1.7 × length (Fig.

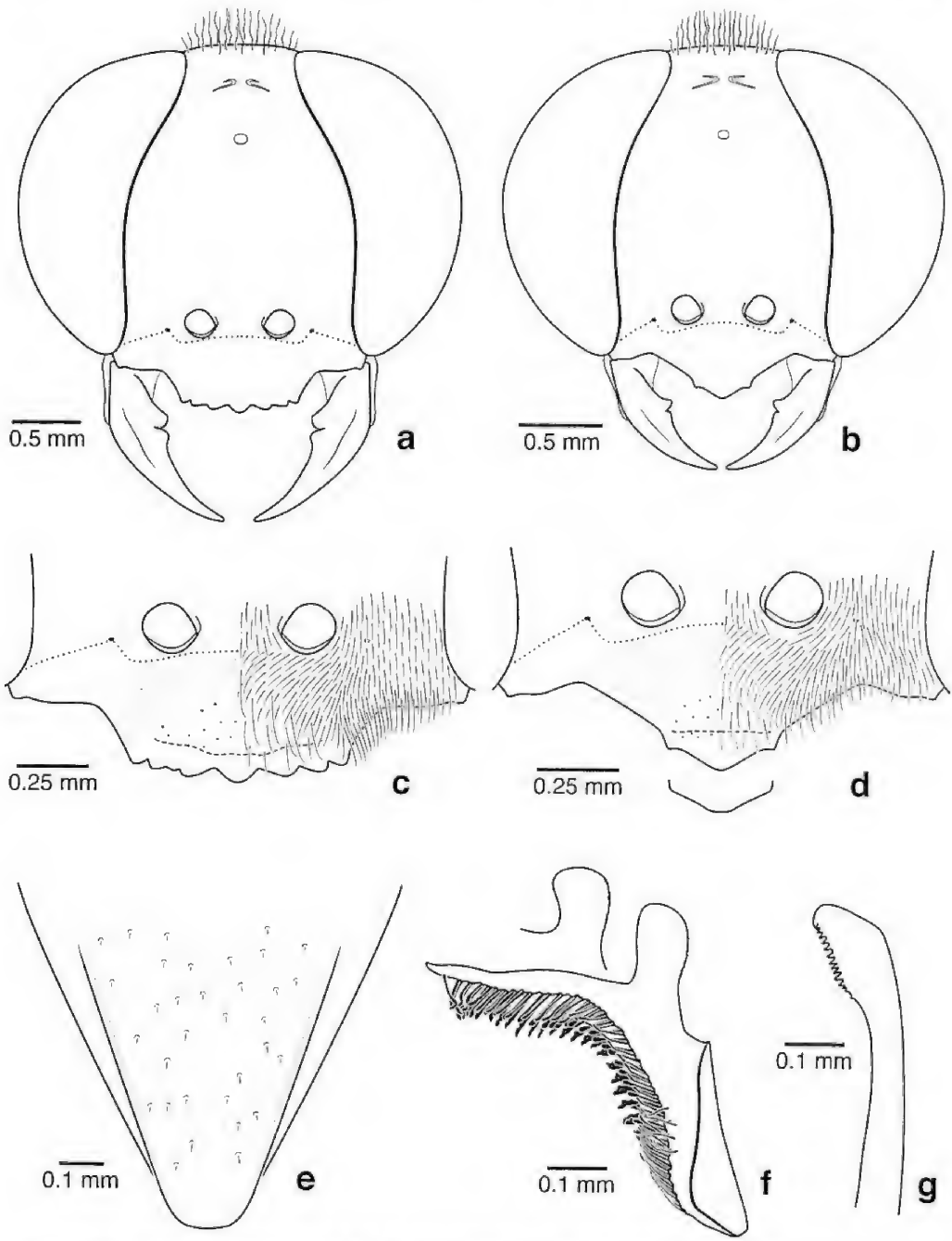


FIGURE 226. *Tachysphex mediterraneus* Kohl: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible with outline showing variation of clypeal free margin; e – pygidial plate of female; f – volsella; g – penis valve.

226b). Dorsal length of flagellomere I 1.6–2.0 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than this tarsomere's width. Sternal punctures dense, microscopically fine; apical margin of sterna III–V shallowly concave. Length 4.6–8.0 mm. Volsella and penis valve: Figs. 226f, g.

NESTING BEHAVIOR.— Ferton (1901a, 1908, 1912, 1923) found the nesting habits of *mediterraneus* to be identical in Corsica and Algeria, and Grandi's observations (1931, 1934, 1961) concur. The burrow is 7–8 cm long and has one to four cells. The cells are 5–7 cm below the surface in sand (Ferton) and 3 cm in clay (Grandi). The nest entrance is closed during the provisioning period except when the female is inside. After completing the nest, the female performs several orientation flights and goes hunting. Prey consists of tree crickets of the genus *Oecanthus*: *O. pellucens* Scopoli in Italy, Corsica, Algeria, and Russia, *O. turanicus* Uvarov in Kazakhstan (Pulawski, 1971; Kazenas and Nasyrova, 1991; Shkuratov, 2001), mainly immature but also male and female adults. The wasp stings her prey three times: near the hindlegs or between the mid- and hindlegs, between fore- and midlegs, and toward the throat. Location of sting corresponds to the location of the cricket's main ganglia. The female opens the nest entrance and enters it without dropping the prey. Three to nine prey are deposited per cell, laying venter up. The egg is deposited on a prey near the cell's bottom or sometimes near the cell's middle. It is placed transversely or obliquely on the cricket's body between the forecoxae or sometimes between the fore- and midcoxae.

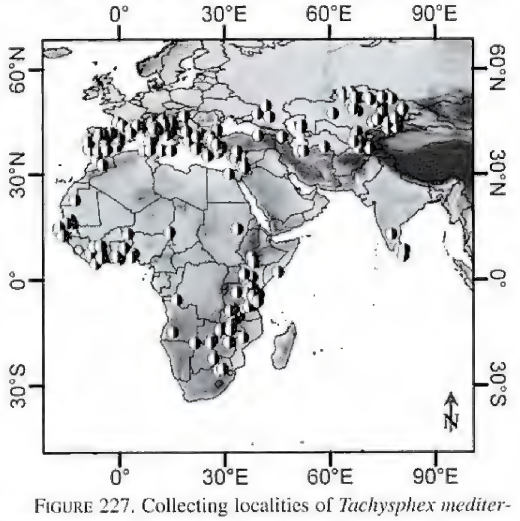


FIGURE 227. Collecting localities of *Tachysphex mediterraneus*.

GEOGRAPHIC DISTRIBUTION (Fig. 227).— Europe north to southern France, Hungary, and Rostov area in Russia, Africa south to northern South Africa, and Asia (Israel, Turkey, Iran, Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan, India, Sri Lanka). Kohl's (1893) record from Austria (Bisamberg) has not been confirmed by subsequent authors, and Herr Hermann Dollfuss could not locate the voucher specimen in the Vienna Museum (his letter of 27 June 1992).

RECORDS.— **ALGERIA**: Skikda (Morice, 1911, as Philippeville). **ANGOLA**: Capelongo at 14°54′S 15°08′E (1 ♀, AMNH). **AZERBAIJAN**: Ganacha near Gäncä (Pulawski, 1971). **BOTSWANA**: Serowe (1 ♀). **BULGARIA**: Aytos (1 ♀, 1 ♂), Nessebyr (2 ♀), mouth of Ropotamo River (1 ♀, 1 ♂), Sandanski (2 ♀), Slanchev Bryag (1 ♀), Sozopol (4 ♂). **CHAD**: islands on Chad Lake (1 ♀, MRAC). **CROATIA** (Pulawski, 1971): Borik near Zadar, Senj. **CYPRUS** (de Beaumont, 1947b; Pittioni, 1950): Cherkes, Pera Pedi, Platres. Also: Kalohorio (Pulawski, 1971), Kakomallis (1 ♀, 2 ♂), Yermasoyia River (1 ♂). **EGYPT**: **Al Jizah**: Ghiza (1 ♀). **ETHIOPIA**: **Gamo Gofa**: 42 road km NNE Arba Minch at 6°17′N 37°47′E (1 ♀), 49 road km SE Sodo (1 ♀, 1 ♂). **Sidamo**: 4 km E Yabelo (1 ♂). **FRANCE** (from Bitsch et al., 2001, if not indicated otherwise): **Aude**: Leucate (2 ♀). **Bouches-du-Rhône**: no specific locality. **Corse**: Ajaccio (Berland, 1925), Bonifacio (Ferton, 1901a, 1908). **Gard**: no specific locality. **Gironde**: no specific locality. **Hérault**: no specific locality. **Landes**: Vieux-Boucaux (Pulawski, 1971). **Pyrénées-Orientales**: Banyuls-sur-Mer (Berland, 1925; Nouvel and Ribaut, 1958), Le Barcarès (Morel, Nouvel, and Ribaut, 1956). **Var**: no specific locality. **Vaucluse**: Carpentras (1 ♂). **GAMBIA**: Fajara (1 ♂, KMG), Lammin (1 ♀, BMNH). **GHANA**: Aburi (1 ♀), Keneba (1 ♀, BMNH), Nkawkaw 80 air km NW Koforidua (2 ♀). **GREECE** (de Beaumont, 1965, or as indicated): **Aegean Islands**: Rhodes: Haraki at Gaidouras River (1 ♂, CSE), Ixia (de Beaumont, 1960), Kolimbia

at Loutani River (1 ♂, CSE); Samothráki. **Ionian Islands**: Corfu: no specific locality (1 ♂). **Kriti** (= Crete): Heraklion, Knossos (1 ♀). **Macedonia**: Agras 7 km NW Edessa (Pulawski, 1971). **Pelopónnisos**: Epano Englianos in Messinia District (1 ♀). **Thrace**: Alexandroupolis. **GUINEA**: Gbié (1 ♀), Kéoulenta (2 ♀). **HUNGARY** (Bajári, 1957a, b): Simontornyá, Szigetszentmiklós. **INDIA**: **Karnataka**: Bangalore: Allalsandra (1 ♀, ZMUC). **IRAN**: **Mazanderan**: coastal plain between Chalus and Shahsavar (1 ♀). **Tehran**: Babol Sar N Tehran (Pulawski, 1971). **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973): Jerusalem, Ramat HaSharon, also En Gedi (Pulawski, 1971). **ITALY**: **Abruzzi**: Vasto Marina (Pagliano, 1990). **Emilia-Romagna**: Badagnano 20 km SE Piacenza (1 ♀), Bobbio in Piacenza Province (Roberti, Frilli, and Pizzaghi, 1965), Cervia in Ravenna Province (Grandi, 1934, 1954), Montetortore (Grandi, 1935), Rimini in Forlì Province (Grandi, 1954), Ronzano in Bologna Province (Grandi, 1935; de Beaumont, 1954a). **Friuli–Venezia Giulia**: Porto Caleri (Negrisolo, 1995), Punta Sabbioni (Negrisolo, 1991). **Isole Pelagie**: Isola di Pantelleria (1 ♀), Pantelleria: Lago Specchio di Venere (Pagliano, 2003). **Lazio**: Pontecorvo in Frosinone Province (1 ♂). **Liguria**: Cavi (Gayubo, Borsato, and Osella, 1991). **Marche**: Pesaro (Pulawski, 1971). **Sardinia**: Cagliari (Pulawski, 1971), Cala Liberotto (Pulawski, 1971), Domusnovas (Pagliano, 1990). **Sicilia**: Scicli (Pagliano, 1990), Valsavoja, now Lentini Diramazione (4 ♀, NHMW, lectotype and paralectotypes of *mediterraneus*). **Toscana**: Alberese Parco Naturale: Uccellina (Gayubo and Borsato, 1994), Campiglia Marittima in Livorno Province (Grandi, 1930; de Beaumont, 1954b), Castiglione della Pescaia (Gayubo and Borsato, 1994), Isola d'Elba (de Beaumont, 1954b), Isola di Capraia (Generani, Pagliano, Scaramozzino, and Strumia, 2003), Livorno (de Beaumont, 1954b), Ronchi in Massa Carrara Province (de Beaumont, 1954a; Grandi, 1954), San Vincenzo in Livorno Province (Grandi, 1934; de Beaumont, 1954a). **IVORY COAST**: Bouaké (1 ♀; 4 ♀, UCD), Bouaké: Foro-foro (2 ♀, 1 ♂; 41 ♀, 13 ♂, UCD), Ferkessedougou (2 ♂), Grand Béréby (1 ♀, MSNT), 30–35 km N Korhogo (1 ♂, ZMAN), Oumé (2 ♀), 40 km S Toumodi (1 ♀, 3 ♂; 1 ♀, 3 ♂, MSNT), 50 km S Yamassoukro (1 ♀). **JORDAN**: Deir Alla (1 ♀, RMNH). **KAZAKHSTAN** (K= Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: Uil (K, P). **Almaty**: 20 km N village Aidarly in Taukum Desert (K), Almatinskiy Nature Reserve (Kazenas and Esenbekova, 2001), Almaty: Medeo (1 ♂), 20 km W Almaty (K), Bakanas (K), 17 km NW and 65 km W Bakanas (K), 10 km W Chundza on Sharyn River (K), Ili 70 km NNE Almaty (K, P), 3 km W and 8 km SW Kamenka in Aksay Gorge in Zailiyskiy Alatau Range (K), Kapchagai (K), 20 km NE Kapchagai (K), 3 km S Talgar (K). **Pavlodar**: Sosnovka (K). **Qaraghandy**: Balqash (K), 5 km SW Balqash (K). **Qostanai**:. Zhalanash (K). **Qyzylorda**: Chokusu railroad station 30 km NW Saksaul'skiy (K). **South Kazakhstan**: 5–8 km SW Chardara (K), 30 km S Lengher (K), Mussa Kuduk in Golodnaya Step (P), 10 km S Syutkent on Syr-Darya River = 140 km WSW Chimkent at about 42°N 68°E (K). **Zhambyl**: 50–70 km NW Furmanovka (K), 10–12 km Kamenka in foothills of Kirghizskiy Range (K), 5 km W Lake Biylikul' (K), Muyunkum sands (K). **KENYA**: **Coast Province**: 30 km S Mombasa (1 ♀), ca 10 km N Taita Discovery Centre (1 ♀), Tiwi Beaches ca 17 km S Mombasa (1 ♂), Voi at 3°24.0′S 38°33.2′E (1 ♀), 16 km SW Voi (1 ♂), Voi area (6 ♂, OÖLM), Waboniland: no specific locality (2 ♀, NHMW, lectotype and paralectotype of *collaris*), Wundanyi (1 ♀, OÖLM). **Eastern Province**: 32 km NW Mtito Andei (1 ♀; 1 ♀, NMK). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♀), Kajiado (1 ♂, MRAC), Magadi road 25 air km SW Nairobi (1 ♂) and 46 air km SW Nairobi at 1°34.0′S 36°27.4′E (1 ♀, 1 ♂), Marich Pass Field Studies Centre (2 ♀), ca 5 km N Namanga (1 ♂). **KYRGHYZSTAN**: 5 km SSE Przheval'sk (Kazenas, 2002). **MALAWI**: Chiromo (1 ♀, BMNH), Florence Bay to Karonga (1 ♀, BMNH). **MAURITANIA**: Fdérik (de Beaumont, 1953a), Kaedi (1 ♂, FB), Lake Aleg 30 km W Aleg (2 ♂). **MOROCCO**: Kenitra (de Beaumont, 1955, as Port Lyautey), 20 km NW Midelt (1 ♂). **NAMIBIA**: **Rundu District**: Andara in Caprivi Strip (1 ♀, NMN). **NIGER**: **Niamey Region**: 8 km NW Niamey at 13°35.8′N 1°59.9′E (3 ♀). **Tillabéri Region**: Say (1 ♀, KMG). **NIGERIA**: Ibadan (2 ♂, BMNH), Lagos (1 ♀, BMNH). **PORTUGAL** (Diniz, 1964, if not indicated otherwise): Carcavelos, Carrapateira 20 km N Sagres at 37°12′N 8°55′W (1 ♀, CSE), Évora, Portimão, Troia, Vale de Gaio near Setubal (1 ♂). **ROMANIA**: Fratesti Vlasca (Pulawski, 1971). **RUSSIA**: **Rostov Oblast'**: Nedvigovka (Minoranskiy and Shkuratov, 1996), Rostovskiy Nature Reserve at 46°27′N 42°41′E (Shkuratov, 2002), Vëshenskaya village area at 49°37′N 41°45′E (Shkuratov, 2000). **SENEGAL**: Bandia Forest (2 ♀, 4 ♂), Dakar (1 ♀, 1 ♂, FB), Ferlo: Feté-olé (2 ♀, 3 ♂; 6 ♀, 14 ♂, UCD), Kayar (1 ♀, MSNT), Toubacouta (1 ♀, FB), Zinguinchor (2 ♀, 3 ♂, MSNT). **SOMALIA**: Afgoi (1 ♂, RMNH). **SOUTH AFRICA**: **Gauteng**: Pretoria (1 ♀, MS). **Mpumalanga**: Mogageni near Loskop Dam at 25°24′S 29°22′E (1 ♂, PPRI). **SPAIN**: **Albacete**: Donal (Tormos, Asís, and Gayubo, 1994). **Alicante** (Torregrosa, Gayubo, Tormos, and Asís, 1993):

Beniarrés, Elche, La Barraca, Monnegre, Muro del Comtat, Novelda, Rebolledo, San Miguel de Salinas, San Vicente del Raspeig, Sax. **Burgos**: Fuentespina (Gayubo and Sanza, 1986). **Cadiz**: Jerez de la Frontera (Pulawski, 1971). **Castellón de la Plana** (Asís and Jiménez, 1988, or as indicated): Matet, Sueraz, Vall d'Alba, Villafranca del Cid (Gayubo and Tormos, 1986). **Ciudad Real**: Pozuelos (Gayubo, 1987). **Gerona**: Palamós (Königsmann, 1971). **Granada**: Granada (de Beaumont, 1962). **Madrid** (Gayubo and Mingo, 1988, or as indicated): El Escorial (Pulawski, 1971), Estación Biogeólogica de El Ventorrillo in Sierra de Guadarrama (Nieves-Aldrey et al., 2003; Gayubo et al., 2004), Madrid, Montarco, Monte de el Pardo (Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004), Ribas de Jarama, Villaviciosa de Odón. **Salamanca**: Las Arribes del Duero (Gayubo, González, and Torres, 2000), San Martín del Castañar (Cruz-Sánchez et al., 2005). **Segovia**: Maderuelo (Gayubo and Sanza, 1986). **Soria** (Gayubo, García, Torres, and González, 1999): Alcubilla del Marqués, Aliud, Almazán, Ciadueña, Cubo de la Solana, Fuentepinilla, Izana, Lubia, Martialay, Pinilla del Campo, Rabanera del Campo, Rebollo de Duero, San Esteban de Gormaz, Tardajos de Duero, Tejado, Valdenarros, Villabuena, Villalvín, Villaverde del Monte. **Toledo**: Toledo (Pulawski, 1971). **Valladolid**: Viana de Cega (González, Gayubo, and Torres, 1998). **Zamora**: Zamora (Gayubo, 1986a). **SRI LANKA**: **Mannar District**: 0.5 mi NE Kokmotte Bungalow in Wilpattu National Park (3 ♀, USNM), Marichchukkaddi (2 ♀, NMC, USNM), Silavathurai and Kondachchi (1 ♀, NMC). **Monaragala District**: Angunakolapelessa (2 ♀, USNM), Mau Ara 10 mi E Uda Walawe (1 ♀, USNM). **Puttalam District**: Kali Villu in Wilpattu National Park (1 ♀, 5 ♂, USNM). **Ratnapura District**: Uggalkaltota, Irrigation Bungalow (1 ♀, USNM). **Trincomalee District**: China Bay (1 ♀, 1 ♂, USNM). **SUDAN**: 150 km SE Khartum (1 ♀, CSE). **TAJIKISTAN** (Pulawski, 1971, or as indicated): Dushanbe (1 ♀), Kabadian, Khorog, Kondara 35 km N Dushanbe (1 ♀, 1 ♂), Varzob (1 ♂). **TANZANIA**: **Arusha Region**: Moshi (1 ♂, RMNH), Tarangiri National Park (1 ♀). **Iringa Region**: 18 km W Iringa (1♂). **Mbeya Region**: Central Rukwa Valley: locality illegible (1 ♂, BMNH). **Morogoro Region**: Dutumi (1 ♀, MCZ), Kilosa (1 ♀, MCZ), 43 km E Morogoro (1 ♀), 62 road km SW Morogoro (3 ♀, 3 ♂), 48 km W Morogoro (23 ♀, 51 ♂; 1 ♀, 4 ♂, MCZ; 2 ♀, 4 ♂, UDS), Ruaha River bank 7 km S Mikumi (1 ♀), Udzungwa National Park 132 km E Iringa (1 ♂). **Shinyanga Region**: Old Shinyanga (1 ♀, BMNH). **Tanga Region**: 33 km SW Korogwe (1 ♀, 3 ♂), 10 km WNW Mabokweni (1 ♀), Pangani River Camp 86 km NW Korogwe (1 ♂). **Zanzibar Region**: Unguja (= Zanzibar Island): Mzingani Forest (1 ♀, KMG). **TOGO**: Amaoudé 17 km N Sokodé (1 ♀). **TUNISIA**: Tabarka (1 ♀, CSE). **TURKEY**: **Adana**: Çalidagi (Pulawski, 1967). **Denizli**: Camlik (Pulawski, 1971). **Istanbul**: Sile area (1 ♂). **Manisa**: Turgutlu (Bytinski-Salz, 1956, as Kasaba). **Mersin**: Mut (Pulawski, 1967). **TURKMENISTAN** (Pulawski, 1971): Anau 10 km E Askhabad, Kara Kala. **UZBEKISTAN**: Aman-Kutan 35 km SW Samarkand (Pulawski, 1971). **ZAIRE**: 34 km W Popokabaka (1 ♀). **ZAMBIA**: **Eastern Province**: mid Luangwa River valley (2 ♀, BMNH), upper Luangwa River valley (4 ♀, 1 ♂, BMNH), 6–18 km SW Mfuwe (1 ♀), 32 km E Petauke (1 ♀, MSNT). **Central Province**: 25 km SSW Kapiri Mposhi (1 ♀, 2 ♂). **Northern Province**: Mbala (3 ♀, 1 ♂, SAM, including lectotype ♀ and 1 paralectotype ♀ of *lanatus*). **Southern Province**: 7 km SW Kalomo (1 ♂). **ZIMBABWE**: Chishawasha near Harare (1 ♀, BMNH), Harare (1 ♀, PMA), Victoria Falls (1 ♀).

Tachysphex melanius Pulawski, sp. nov.

Figures 228, 229.

Tachysphex argentifrons Arnold, 1924:58, ♀ only, **present correction**.

DERIVATION OF NAME.— *Melanius*, from the Greek word *melania*, blackness, here used as a Latin masculine adjective. With reference to the predominantly black body of this species.

RECOGNITION.— *Tachysphex melanius* has a convex labrum (protruding beyond the clypeal free margin), galea longer than wide in profile (equal to 0.8 of scape), cephalic and thoracic setae all straight (appressed on postocellar area and midfemoral venter), propodeal side all ridged, upper metapleural pit oblong, propodeal dorsum setose throughout, with setae diverging anterolaterad from the midline (a small apicomedian area glabrous in some specimens), male forefemur emarginate basally, and male sterna V and VI each with a basal fringe of agglutinated setae (fringes visible only when the sterna are fully expanded).

The female of *melanius* has a slightly expanded apicoventral portion of foretarsomeres I–III (insignificantly so in some specimens), with the apical rake spines of these tarsomeres originating on the ventral surface rather than on the outer margin (as in Fig. 9c). This feature is shared with *aethiopicus*, *miniatulus*, *rotundus*, *ruber*, and *usakos*, but unlike these species the gaster of *melanius* is all black; furthermore, the black femora differentiate it from *aethiopicus* and *ruber*.

The male can be distinguished from the other species with the above characteristics in having a black gaster, the outer apical spines of foretarsomere II emerging from the ventral surface rather than the outer margin (as in Fig. 9d), and dense clypeal punctation not reaching the lip base (Fig. 228b). In addition, the clypeal lobe is broad in most specimens (corners closer to the respective orbit than to each other). Some *aethiopicus* also have a black gaster, but the dense clypeal punctation extends to lip base, at least laterally.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, with a few scattered, ill-defined punctures, longer than wide in profile, as long as 0.8 of scape. Scutal integument varying: punctures in most specimens somewhat ill defined and interspaces microsculptured, dull, but individuals from Klaserie area, South Africa, and from Botswana have well-defined punctures and unsculptured, shiny interspaces. Mesopleuron dull, with punctures minute, about one diameter apart or less. Propodeal dorsum evenly microareolate, side ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; no longer than midocellar diameter on each

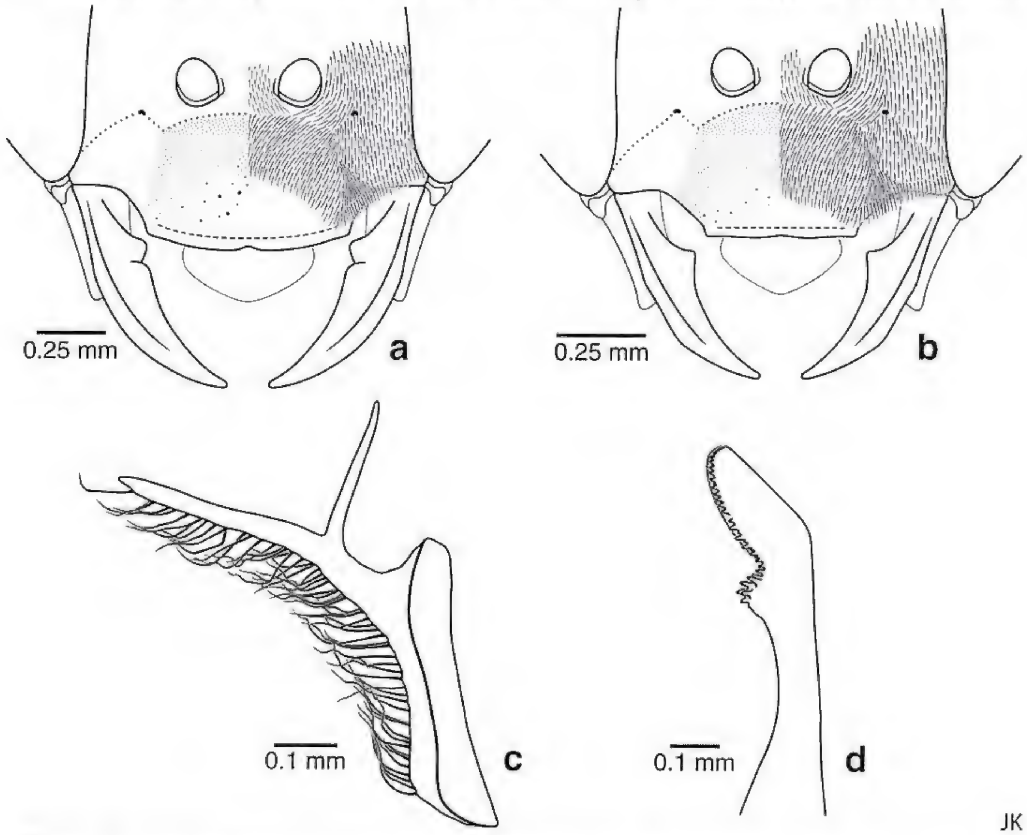


Figure 228. *Tachysphex melanius* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

side of oral fossa next to occipital carina; appressed or nearly so on mesopleuron; diverging anterolaterad from midline on propodeal dorsum (small apicomedian area glabrous in some specimens).

Head and thorax black, mandible reddish (except basally and apically), clypeal bevel reddish apically in some males. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal vein dark brown, subcostal vein dark brown to black. Femora and gaster black (forefemur red except dorsum black in single male from Algoa Bay, South Africa), tibiae and tarsi varying in color (see below for details). Terga I–III to I–V silvery fasciate apically.

♀.— Clypeus (Fig. 228a): bevel varying from shorter to longer than basomedian area, with interspaces that vary from unsculptured and shiny to conspicuously microsculptured and dull; lip biarcuate or emarginate mesally, neither incised nor sinuous laterally. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 2.2–2.3 × apical width. Forecoxa with inconspicuous apicomedian process. Dorsal foretibial surface with one or two spines; outer surface with one or two spines. Forebasitarsus with six (occasionally seven) rake spines. Foretarsomeres I–III slightly expanded apicolaterally over bases of rake spines (as in Figs. 9c, e). Tergum V uniformly micropunctate and setose, including apical depression. Pygidial plate with scattered punctures, interspaces varying from unsculptured, shiny to conspicuously microsculptured, dull. Length 6.6–8.6 mm. Tibiae all black or the following yellowish red: foretibia (except ventrally), midtibial dorsum, and hindtibial dorsum (except distally). Tarsi black, reddish apically in most specimens, but brown (red apically) and foretarsus all red in females from Botswana.

♂.— Mandible: trimmal carina with tooth, without cleft (Fig. 228b). Clypeus (Fig. 228b): bevel shorter than basomedian area, varying from unsculptured and shiny between punctures to conspicuously microsculptured and dull; lip free margin straight or minimally concave, corner sharp to rounded; distance between corners 1.3 × distance between corner and orbit in most specimens, but 1.0 and 0.9, respectively, in two males from Van Reenen, South Africa. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width. Forefemoral notch wide, microscopically setose to asetose. Outer margin of forebasitarsus with four or five rake spines. Foretarsomere II or I and II slightly expanded apicolaterally over bases of rake spines (as in Figs. 9d, f), minimally so in smallest specimens; outer apical spine of foretarsomere II longer than tarsomere III. Sterna IV–VI each with basal fringe of agglutinated setae (fringes visible only when sterna are fully expanded). Length 5.2–7.3 mm. Volsella and penis valve: (Figs. 228c, d), penis valve in some specimens of equal diameter in distal half. Foretibia red, midtibia all red to largely black, hindtibia all red to all black; tarsi red or midtarsus partly and hindtarsus all black.

GEOGRAPHIC DISTRIBUTION (Fig. 229).— Angola, Botswana, Zimbabwe, Namibia, Lesotho, South Africa.

RECORDS.— HOLOTYPE: ♀, **SOUTH AFRICA: Eastern Cape Province**: Algoa Bay, 19 Dec [18]95, Dr. Brauns (TMP), paralectotype of *argentifrons* Arnold. PARATYPES: **ANGOLA**: Tundavala 8–10 mi NW Sa da Bandeira, 27–29 Mar 1972, [BMNH Southern Afr[ican] Exp[edition] (1 ♂, BMNH). **BOTSWANA**: 25 mi W Gweta at 20°17′ S 24°54′E, 21–22 Apr 1972, [British Museum] Southern African Expedition (2 ♀, BMNH). **LESOTHO**: Mamathes, 22 Dec 1959, C. Jacot

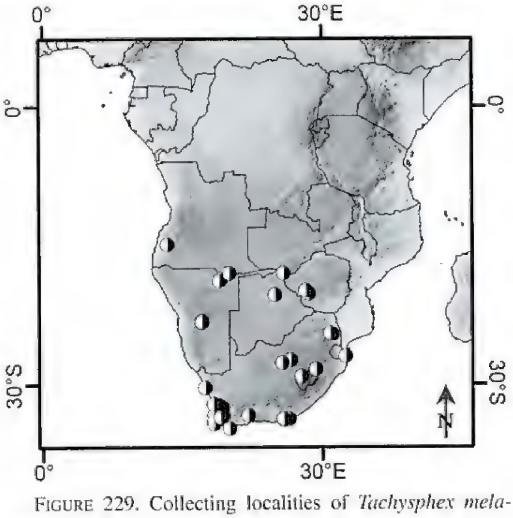


FIGURE 229. Collecting localities of *Tachysphex melanius*.

Guillarmod (1 ♀, AMG). **NAMIBIA**: **Rehoboth District**: 7 km N Rehoboth, 7 Feb 1990, MS (1 ♀, MS); 9 km N Rehoboth, 15 Feb 1990, WJP (1 ♀); 23 km N Rehoboth, 15 Feb 1990, MS (1 ♀, MS); same locality, WJP, 6 Feb 1990 (5 ♀, 2 ♂) and 15 Feb 1990 (3 ♀, 1 ♂). **Rundu District**: Rundu, 19 and 23 Jan 1993, MS (2 ♀, MS); 30 km E Rundu, 23 Jan 1993, J. Gusenleitner (1 ♀, JG); same locality and date, MS (1 ♀, MS); 100 km SW Rundu, 1 Feb 1993, MS (1 ♀, MS); 125 km SW Rundu, 16 Jan 1993, J. Gusenleitner (2 ♀, JG). **SOUTH AFRICA**: **Eastern Cape Province**: 10 km SE Alexandria, 28–31 Jan 2000, M. Halada (1 ♂, OÖLM); Algoa Bay, H. Brauns, 7 Feb 1892 (1 ♀, SAM, paratype of *argentifrons*) and 8 Nov 1896 (3 ♀, 1 ♂, TMP); Colchester at 33°42′S 25°50′E, 5 Jan 1997, WJP (1 ♂). **Free State**: Bothaville, date illegible, H. Brauns (1 ♀, SAM, paratype of *argentifrons*); Sandveld Nature Reserve ca 5 air km E Bloemhof at 27°40′S 25°41′E, 12 Jan 1996, WJP (1 ♂). **Kwazulu-Natal**: Tembe Elephant Park, Marek Halada, 30 Nov 2002 (1 ♀, 3 ♂, OÖLM) and 8 Dec 2002 (2 ♀, 1 ♂, OÖLM); Van Reenen in Drakensberg Mts., R.E. Turner, Nov 1926 (1 ♂, BMNH) and 1–22 Jan 1927 (1 ♂, BMNH). **Northern Cape Province**: 18 km E Hondeklipbaai at 30°21′34″S 17°26′27″E, 17 Nov 1996, M.E. Irwin (2 ♀, CSE). **Northern Province**: Guernsey Farm 15 km E Klaserie, 19–31 Dec 1985, H. and A. Howden (1 ♀, PMA); same locality, 22–31 Dec 1985, M. Sanborne (1 ♀, 2 ♂, PMA); Guernsey Farm 15 km NW Klaserie, S. and J. Peck, 19–31 Dec 1985 (4 ♀, 2 ♂, PMA). **Western Cape Province**: 25 km S Bredasdorp, 23 Oct 1999, M. Halada (2 ♂, OÖLM); Cape of Good Hope Nature Reserve near Olifantbosbaai, 7 Jan 1997, WJP (3 ♀); Cape Town, no date, J.C. Bridwell (1 ♀; 2 ♀, USNM); Cape Town: Table Mountain at 33°57′S 18°24′E, 21 Dec 1996, WJP (1 ♂); 60 km N Cape Town, 9 Nov 1999, M. Halada (2 ♂, OÖLM); Cederberg, 12 Dec 1973, P.M.F. Verhoeff (1 ♂, RMNH); Ceres, R.E. Turner, Nov 1920 (1 ♀, BMNH) and Dec 1920 (2 ♀, BMNH); 20 km N Citrusdal, 27 Oct 1999, M. Halada (1 ♀, OÖLM); 11 km W Clanwilliam on road to Graafwater, 1 Dec 1989, F.W. Gess (1 ♀, AMG); S of Lambert's Bay, 7 Oct 1999, M. Halada (3 ♀, 1 ♂, OÖLM); Swartberg Pass, 12 Feb 2002, D.W. Baldock (1 ♂, BALDOCK), near Swartberg Pass, ca 1450 m, at 33°20′S 22°02′E, 30 Dec 1996, WJP (1 ♀, 2 ♂); Wellington: Rooshoek, Dec 1973, P.M.F. Verhoeff (1 ♀, RMNH). **ZIMBABWE**: Bulawayo, 8 Dec 1938, R.H. Stevenson (1 ♀, AMG); 11 km NE Nyamandhlovu, 24 Feb 1995, WJP (1 ♂); Victoria Falls, WJP, 1–8 Feb 1995 (2 ♀) and 19–22 Dec 1995 (11 ♀).

Tachysphex mesembrius Pulawski, sp. nov.

Figures 230, 231.

Derivation of name.— *Mesembrius*, a Neolatin adjective coined from the Greek noun *mesembria*, midday, noon, south.

Recognition.— *Tachysphex mesembrius* has the forefemoral venter and posteroventral midfemoral surface with large punctures that are many diameters apart (interspaces shiny); the setae are sinuous and erect on the postocellar area (Figs. 230a, b), and sinuous and inclined posterad on the propodeal dorsum. The female has a distinctive clypeus (Fig. 230c) whose lip has two lateral incisions on each side and the corner is markedly more dorsal than the midpoint, and the mandibular cleft is widely open (Fig. 230c). Subsidiary recognition features are: gaster, femora, and tibiae black; terga nonfasciate; and male clypeal lip pointed (Fig. 230b).

Description.— Scutal and mesopleural punctures several diameters apart, varying from fine to conspicuous. Propodeal dorsum dull, with irregular ridges in female, with evanescent ridges in male; side ridged. Hindcoxal dorsum with inner margin not carinate. Forefemoral venter and posteroventral midfemoral surface shiny, with large punctures that are many diameters apart.

Setae (numbers in parentheses refer to setal length expressed as a fraction of basal mandibular width): sinuous and erect or nearly so on postocellar area (up to 0.5, Figs. 230a, b) and scutum anteriorly (0.5–0.6); erect on each side of oral fossa next to occipital carina (up to 0.3); sinuous on mesopleuron; sinuous, oriented posterad on propodeal dorsum (apicomedian area glabrous).

Head and thorax black, mandible reddish near apex. Frontal setae silvery in female, silvery or golden in male. Wing membrane almost hyaline; costal vein of forewing light brown, subcostal vein brown. Legs and gaster black except tarsal apex reddish brown. Terga not fasciate.

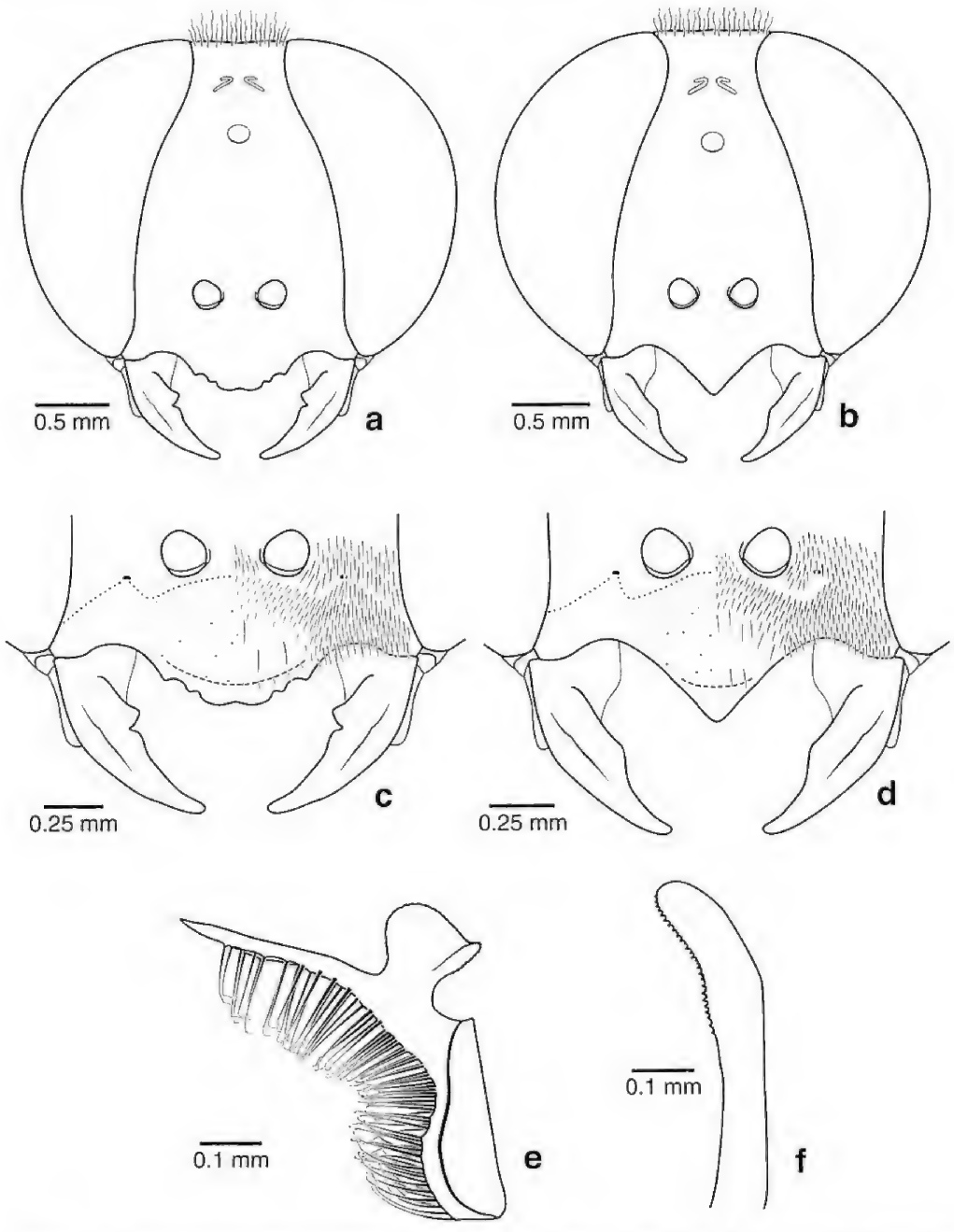


FIGURE 230. *Tachysphex mesembrius* Pulawski, sp. nov.: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

♀.— Mandible: cleft unusually broad, widely open (Fig. 230c). Clypeus (Fig. 230c): bevel about as long as basomedian area, unsharply delimited from the latter; lip free margin with two lateral incisions on each side and corner placed markedly more dorsally than midpoint. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 1.9–2.0 × apical width. Midtrochanteral venter: punctures several diameters apart, interspaces unsculptured. Dorsal foretibial surface with two spines; outer surface with unsculptured zone, with one or two spines. Forebasitarsus with nine or ten rake spines. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with punctures that average several diameters apart on disk, interspaces unsculptured or nearly so. Length 8.8–9.3 mm.

♂.— Mandible: trimmal carina broadened mesally, but without tooth or cleft (Fig. 230d). Clypeus (Fig. 230d): bevel ill defined, about as long as basomedian area; lip free margin pointed, forming single curved line with rest of clypeal margin. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 1.5 × apical width. Forefemoral notch narrow, microscopically setose, margined both anteriorly and posteriorly. Outer margin of forebasitarsus without preapical spines or with one preapical rake spine next to apical one; outer apical spine of foretarsomere II shorter than tarsomere III. Punctures of sterna III–VI (except near lateral margins) averaging more than one diameter apart; apical depressions of sterna II–VI unsculptured, glabrous. Length 7.8–8.3 mm. Volsella and penis valve: Figs. 230e, f.

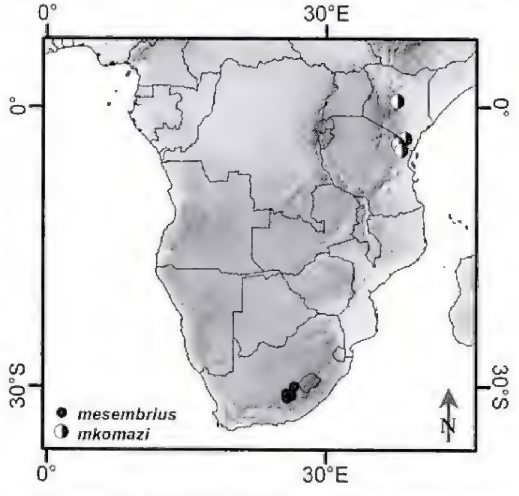


FIGURE 231. Collecting localities of *Tachysphex mesembrius* and *mkomazi*.

GEOGRAPHIC DISTRIBUTION (Fig. 231).— Known from a few adjacent localities in central South Africa.

RECORDS.— HOLOTYPE: ♀, **SOUTH AFRICA: Eastern Cape Province**: Venterstad Region, Oct 1935, [South African] Mus[eum] Staff (SAM). PARATYPES: **SOUTH AFRICA**: **Eastern Cape Province**: Albert District between Burgersdorp and Nooitgedacht, 6 Oct 1935, [South African] Mus[eum] Staff (1 ♀); Middelburg Division, Oct 1935, [South African] Mus[eum] Staff (1 ♂, SAM); Steynsburg Division, Oct 1935, [South African] Mus[eum] Staff (1 ♂, SAM); Venterstad Region, Oct 1935, [South African] Mus[eum] Staff (1 ♂).

Tachysphex micans (Radoszkowski)

Figures 232–234.

Tachytes micans Radoszkowski, 1877:29, ♀, ♂. Syntypes: Kazakhstan: Kyzil-Kum Desert: no specific locality (ZMMU), examined before 1971.— Radoszkowski, 1886a:34 (male genitalia).— As *Tachysphex micans*: Kohl, 1885:396 (tentative new combination, original description copied), 1888:143 (new combination, redescription); Radoszkowski, 1892:590 (reference to Radoszkowski, 1886); Dalla Torre, 1897:681 (in catalog of world Hymenoptera); de Beaumont, 1936b:610 (redescription), 1940:164 (in revision of Egyptian *Tachysphex*), 1947a:159 (in revision of Egyptian *Tachysphex*), 1955:176 (Morocco), 1956a:196 (Libya); Grandi, 1957:389 (Libya); Myartseva, 1963:58 (Turkmenistan); Pulawski, 1964:83 (Egypt), 1971:282 (in revision of Palearctic *Tachysphex*); Myartseva, 1972a:79 (Turkmenistan); Tsuneki, 1972:383 (Mongolia); Bohart and Menke, 1976:274 (listed); Kazenas, 1978:112, 124 (in key to Sphecidae of Kazakhstan and Central Asia); Guichard, 1980:227 (Oman); Kazenas and Nasyrova, 1991:38 (prey); Roche

and Zalat, 1994:115 (Egypt: Sinai Peninsula); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia), 158 (review of known biology), 2002:71 (Kazakhstan). As *Tachysphex vestitus*: Maidl, 1924:236 (Sudan), corrected to *Tachysphex micans* by Pulawski, 1971:283.

Recognition.— *Tachysphex micans* has the labrum convex and conspicuously protruding beyond the clypeal free margin, but differs from other such species (except many *pulcher*) in having the inner hindtibial spur with unusually thick and sparse rays (Fig. 233d), at least near midlength. Unlike most other species with a convex labrum, *micans* also has abundant, unusually long, sinuous setae on the lower gena (longest setae equal to 0.8–0.9 of basal mandibular width), setae appressed on the postocellar area and fully concealing integument on the mesopleuron (at least in fresh specimens), and the propodeal side uniformly microsculptured and setose throughout. The latter combination (including a convex labrum) is also found in *pulcher* and the extralimital *fuscispina* Pulawski (Turkmenistan, male unknown). In *micans*, however, the longest setae on the lower gena are about two midocellar diameters long (Fig. 233a), those of tergum I are slightly sinuous, largely concealing the integument, and generally not entirely appressed, thus forming a stratum about as thick as the midocellar diameter (Fig. 233b), and the free margin of the lateral clypeal section, in the female, is straight or minimally concave (Fig. 232a). In the other two species, the longest setae of lower gena are slightly more than one midocellar diameters long, those of tergum I are straight, appressed, not concealing the integument, and in the female the free margin of the clypeal lateral section is the usual shape, i.e., visibly concave (as in Fig. 298a). Also, setae of the

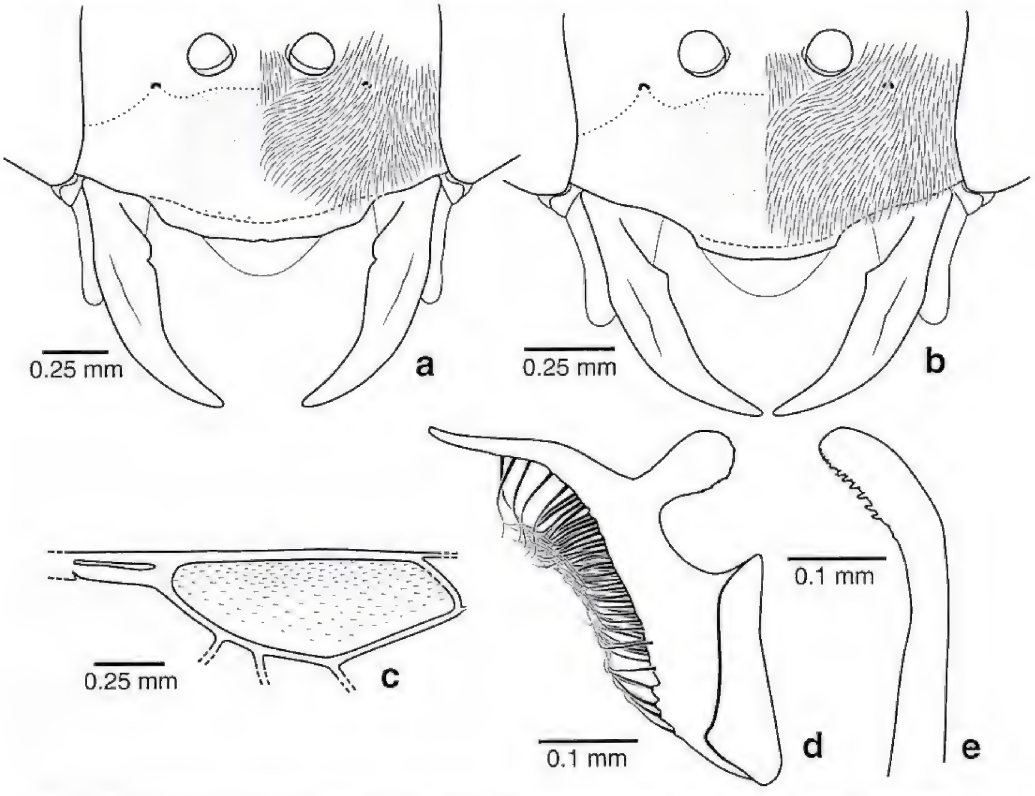


Figure 232. *Tachysphex micans* (Radoszkowski): a – female clypeus and mandible; b – male clypeus and mandible; c – marginal cell of female forewing; d – volsella; e – penis valve.

propodeal dorsum are sinuous in *micans* (straight in *fuscispina* and most *pulcher*), those of the foretibial outer surface totally (or nearly so) conceal the integument (integument easily visible in *fuscispina*), apical spines of female tarsomeres IV are twice as long as the tarsomere's apical width and reaching the claw bases (as long as the tarsomeres apical width in *fuscispina*), and female tergum V is punctate and setose throughout (apical depression impunctate and glabrous except laterally in *fuscispina*). The shape of the volsella, with its narrow, elongate dorsal process, is also distinctive (Fig. 232d).

Description.— Labrum convex, markedly protruding beyond clypeal free margin. Galea microsculptured and with a few, sparse punctures, as long as 0.9–1.1 of scape. Scutum and mesopleuron uniformly, microscopically granulose. Propodeal dorsum evenly, microscopically areolate; side uniformly microsculptured. Hindcoxal dorsum with inner margin carinate basally. Inner spur of hindtibia with relatively thick and widely spaced rays (Fig. 233d), at least near midlength.

Setae sinuous on gena (Fig. 233a), thorax, and femora (Fig. 233c); appressed on postocellar area; fully concealing integument on frons (at least in its lower half) including supraantennal swelling, on mesopleuron, and on scutum anteriorly; equal to 0.8–0.9 of basal mandibular width on each side of oral fossa next to occipital carina (Fig. 233a); on propodeal dorsum oriented essential-

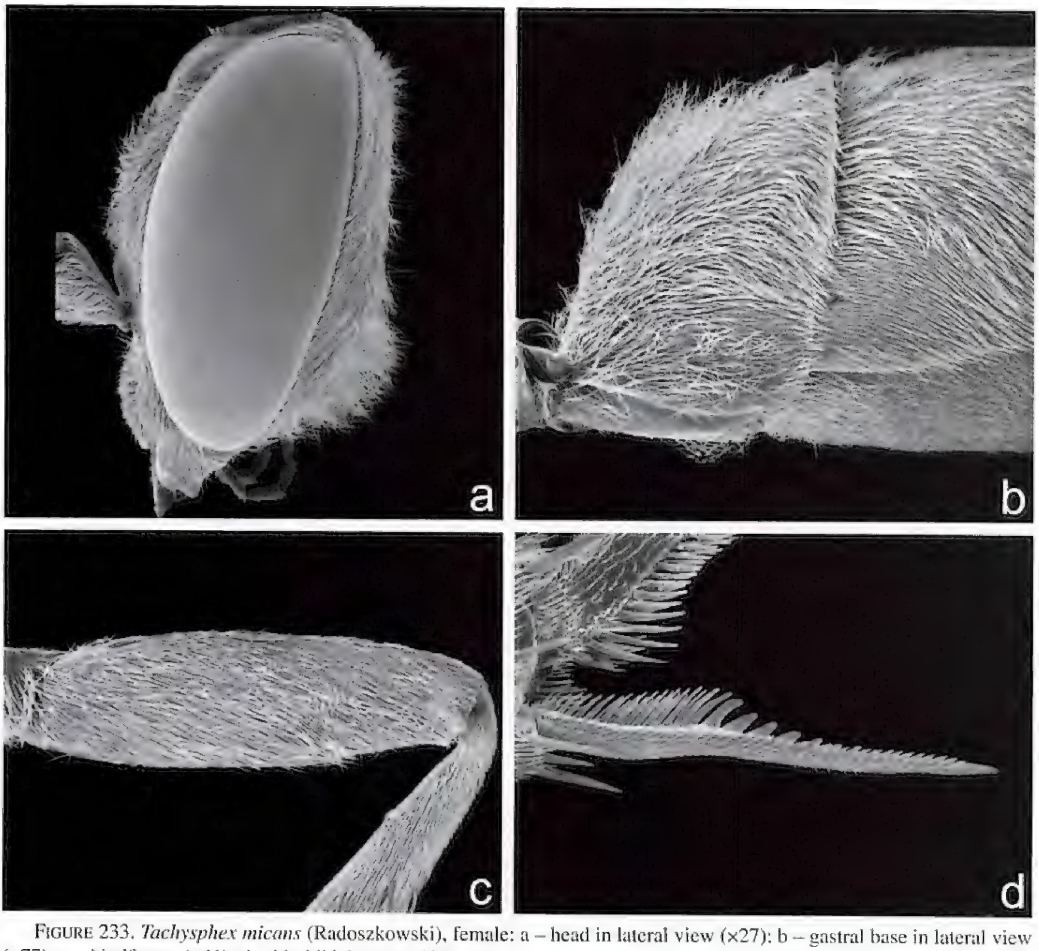


Figure 233. *Tachysphex micans* (Radoszkowski), female: a – head in lateral view (×27); b – gastral base in lateral view (×77); c – hindfemur (×41); d – hindtibial spur (×107).

ly posterad; concealing integument on hindfemoral outer surface and (with rare exceptions) on hindtibial dorsum; on basal half of tergum I sinuous and suberect, about twice as long as midocellar diameter, largely concealing integument, generally forming a layer about as thick as midocellar diameter (Fig. 233b); on tergum II not concealing integument or concealing on basal half; propodeal side setose throughout. Marginal cell sparsely microsetose (Fig. 232c).

Head and thorax black (thorax red in a female from Iran) except clypeal middle section yellowish in apical half and mandible yellowish red (black in apical third). Frontal setae silvery in both sexes. Wing membrane hyaline; costal and subcostal veins of forewing yellowish brown. Femora varying from all black to all red, tibiae and tarsi red. Gaster red. Terga I–V in female, I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 232a): bevel shorter than basomedian area; lip free margin arcuate or with median emargination, not incised laterally; free margin of lateral section straight or minimally concave. Width of postocellar area 0.6–0.9 × length. Dorsal length of flagellomere I 2.4–3.1 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with 7–10 (mostly seven) rake spines. Apical spines of hindtarsomere IV reaching claw bases. Tergum V uniformly punctate and setose, including apical depression. Pygidial plate with punctures that average many diameters apart; interspaces microsculptured. Length 6.5–13.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 232b): bevel absent; lip free margin arcuate or with rudimentary median emargination, with ill-defined corner and no carina emerging from the latter; distance between corners 1.1 × distance between corner and orbit. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 2.0–2.6 × apical width. Forefemoral notch with bottom glabrous or microscopically setose. Outer margin of forebasitarsus with 4–7 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 5.5–8.0 mm. Volsella and penis valve: Figs. 232d, e.

Prey.— Nymphal acridid *Diexis varentzowi* Zubovskiy in Turkmenistan (Myartseva, 1965) and *Sphingonotus decorus* (Germar) and *Leptopternis gracilis* (Eversmann) in Kazakhstan (Kazenas and Nasyrova, 1991).

Geographic distribution (Fig. 234).— Morocco to Egypt, south to Mali and Sudan, also Arabian Peninsula, Kazakhstan, Uzbekistan Turkmenistan, and Mongolia.

Records.— EGYPT: Al Jizah (= Ghiza): Abu Rawash (1 ♀), Dahshur (6 ♀, 5 ♂), Katta (de

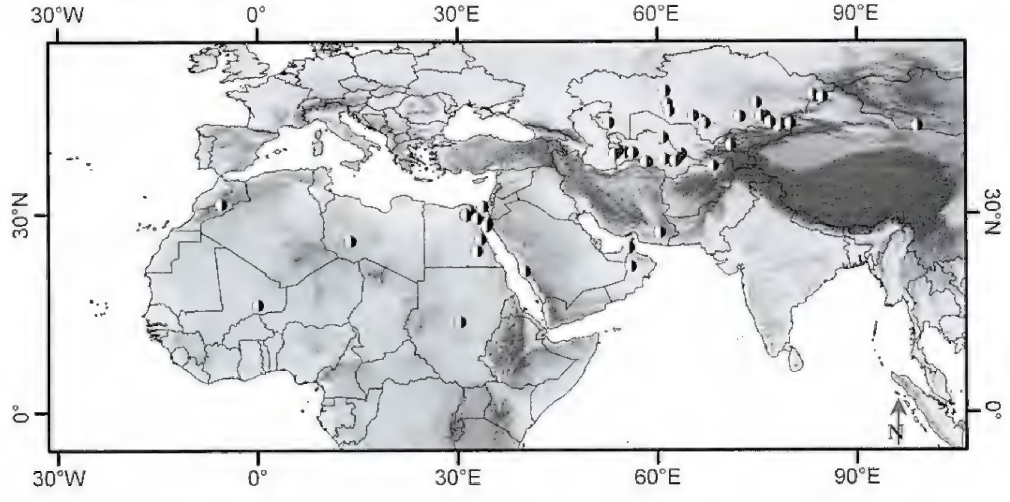


FIGURE 234. Collecting localities of *Tachysphex micans*.

Beaumont, 1940). **Al Qahirah** (= Cairo): Suez road (de Beaumont, 1940), Wadi Digla (Pulawski, 1971). **Aswan**: near Kom Ombo temple (9 ♂). **Qena**: 85 km E Qena on Safaga road (1 ♀). **Sina** (= Sinai): El Arish (Roche and Zalat, 1994), Wadi Feiran (de Beaumont, 1940), Wadi Ghaib 50 km SSE Nuweiba (1 ♀, 3 ♂), Wadi Gharandal 30 km NW Abu Zeneima (2 ♂), Wadi Khreza (= Wadi Kid) 40 km N Sharm el Sheikh (7 ♂; 2 ♂, MSNT). **IRAN**: Bampur - Kaskin (Pulawski, 1971). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971). **Aktöbe**: Yrghyz (K), 5 km S Yrghyz (K). **Almaty**: 20 km N village Aidarly in Sarytaukum Desert (1 ♂), Bakanas (K), 65 km W Bakanas (K), 60 km E Chilik (1 ♀), 35 km S and 35–80 km E Chilik (K), Dubun' on Ili River 80 km E Chilik (1 ♂), Ili (P), Kapchagai (K). **East Kazakhstan**: 20 km NE Belaya Shkola = about 20 km W Zaysan at about 48°N 83.5°E (K), Rozhkovo at about 47.5°N 85.5°E (K). **Mangghystaū**: Sozdy 135 km ESE Tauchik (1 ♀, 2 ♂). **Qaraghandy**: 1 km NW Balqash (1 ♀). **Qyzylorda**: 7–30 km SW Aral'sk (K), Djulek = Chiili (P), 28 km SW Kazalinsk (1 ♂), Qyzylorda (P), 20 km S Yany-Kurgan (K). **Zhambyl**: 50–70 km NW Furmanovka (K), 60 km NW Furmanovka (1 ♀), 70 km NW Furmanovka (1 ♀, 2 ♂). **LIBYA**: **Fezzan**: Murzuk (de Beaumont, 1956a). **Tripolitania**: Wadi Endeliba (Grandi, 1957). **MALI**: Tilemsi valley N Gao (1 ♀, KMG). **MONGOLIA**: **Bayanhongor Aymag**: Ehingol oasis ca 90 km N Tsagaan Bulag (Tsuneki, 1972). **MOROCCO**: Tinerhir (de Beaumont, 1955). **OMAN**: **Northern Oman**: Qurum (Guichard, 1980). **SAUDI ARABIA**: Wadi Majarish below Taif (1 ♀, KMG). **SUDAN**: Bara ca 300 km SW Khartum (Pulawski, 1971). **TAJIKISTAN**: Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TURKMENISTAN** (Pulawski, 1971, if not indicated otherwise): Akhcha-Kuyma near Nebit-Dagh, Akibai 40 km N Mary, Anau 10 km E Askhabad, Askhabad, Djebel (1 ♀), Farab, Kara-Bogaz 40 km N Kizyl Arvat, lower Murgab River (Myartseva, 1963), Repetek (1 ♀), Uch-Adji, Uzun-Ada on E shore of Krasnovodsk Golf. **UNITED ARAB EMIRATES**: Rifaa (1 ♂, KMG). **UZBEKISTAN**: Khiva (1 ♂), Khiva: Ravat (1 ♀, 1 ♂), Shassenem 75 km WSW Tashauz (Pulawski, 1971).

Tachysphex miniatulus Arnold

Figures 235, 236.

Tachysphex panzeri var. *miniatulus* Arnold, 1924:70, ♀. Lectotype: ♀, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex miniatulus*: Arnold, 1947:147 (new status, description of ♂); Bohart and Menke, 1976:275 (listed).

LECTOTYPE SELECTION.— Arnold (1924) described this species from four females that he called "Types" in the original description. He actually designated one female as type and another as a paratype, and left the other two unlabeled. I designate as lectotype the female that he selected as type, and the other three as paralectotypes.

RECOGNITION.— *Tachysphex miniatulus* has a convex labrum (protruding beyond the clypeal free margin), galea about as long as the scape, and straight cephalic and thoracic setae (appressed on the postocellar area and midfemoral venter) combined with an all ridged propodeal side, oblong upper metapleural pit, and the propodeal dorsum setose throughout, with setae diverging anterolaterad from the midline. In the male, the forefemur is emarginate basally and sterna IV–VI each has a basal fringe of erect, agglutinated setae (the fringes are visible only when gastral segments are fully expanded).

The female of *miniatulus* has a slightly expanded apicoventral portion of foretarsomeres I–III, so that the apical rake spines of these tarsomeres originate from the ventral surface (as in Fig. 9c) rather than from the outer margin. This feature is shared with *aethiopicus*, *melanius*, *rotundus*, *ruber*, and *usakos*. The female of *miniatulus*, however, differs in having a combination of: clypeus, labrum, and femora all black (labrum reddish brown in some specimens); gaster red basally and black apically; and pygidial plate microsculptured between punctures. Some *rotundus* are identical, but in *miniatulus* the clypeal lip is emarginate mesally (Fig. 235a), the clypeal bevel extends over the entire width of the middle clypeal section (dense clypeal punctation not reaching lip base), and the foretarsal rake spines are pale. In *rotundus*, the clypeal lip is barely emarginate mesally, the

bevel is narrower that the clypeal middle section (dense clypeal punctation reaching the lip base along lateral quarter or so of the lamella's width), and the foretarsal rake spines are black or dark brown. Unlike *aethiopicus* and *usakos*, the pygidial plate of *miniatulus* is aciculate between punctures.

The male can be distinguished from similar species by the following combination: clypeal lip with corner obtuse (Fig. 235b), clypeus and labrum all black, gaster red basally and black apically, femora black (at most narrowly red apically), and tibiae partly black.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea evenly microsculptured, with a few, sparse punctures, as long as scape. Scutal punctures small but well defined, no more than one diameter apart in female, but many punctures up to several diameters apart in some males. Mesopleural punctures somewhat ill defined, about one diameter apart; interspaces microsculptured, dull. Propodeal dorsum microareolate, side ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area, scutum, and on each side of oral fossa next to occipital carina, on propodeal dorsum diverging anterolaterad from midline.

Head and thorax black, mandible largely black (reddish preapically) to largely yellowish red (black basally and apically), labrum reddish brown in some specimens. Frontal setae silvery in both sexes. Wing membrane almost hyaline; forewing costal and subcostal veins brown. Femora black or narrowly red apically; tibiae varying from black (foretibia reddish on inner surface) to partly reddish (foretibia nearly all reddish); tarsi all red or black basally and red apically, all black in some females. Gastral segments I and II or I–III red, remainder black. Terga I–IV silvery fasciate apically (also tergum V in some males).

♀.— Clypeus (Fig. 235a): bevel longer to shorter than basomedian area, anteriorly as wide as lip; lip free margin arcuate, emarginate mesally, sinuous laterally. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 2.6 × apical width. Dorsal foretibial surface with two spines; outer surface with two or three spines. Forebasitarsus with seven or eight rake spines. Foretarsomeres I and II slightly expanded apicolaterally, with apical spines originating from ventral surface rather than from outer margin (as in Figs. 9c, e). Apical depression of tergum V densely micropunctate and setose. Pygidial plate with punctures that average several to many diameters apart; interspaces aciculate. Length 8.6–10.0 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Fig. 235b): bevel about as long as basomedian area; lip free margin biarcuate, with obtuse corner (slightly concave

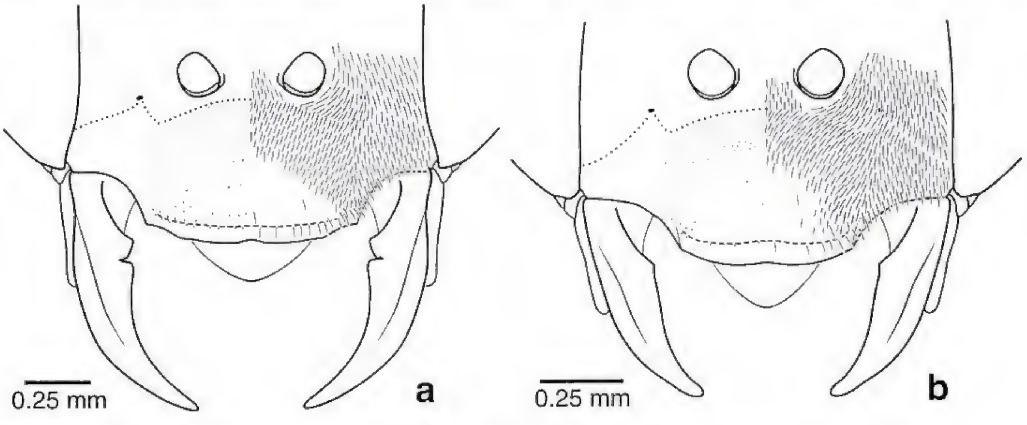


Figure 235. *Tachysphex miniatulus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible.

near corner in some specimens); distance between corners 1.4–1.7 × distance between corner and orbit. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.5–1.9 × apical width. Forefemoral notch glabrous or with microscopically small setae that are difficult to see. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Tergum VII: punctures about two diameters apart basomedially. Sterna IV–VI (except laterally) each with basal fringe of agglutinated setae (that of sternum IV rudimentary); fringes visible only when sterna are fully extended. Length 6.5–8.0 mm. Volsella as in *pentheri* (see Fig. 277a), penis valve simple.

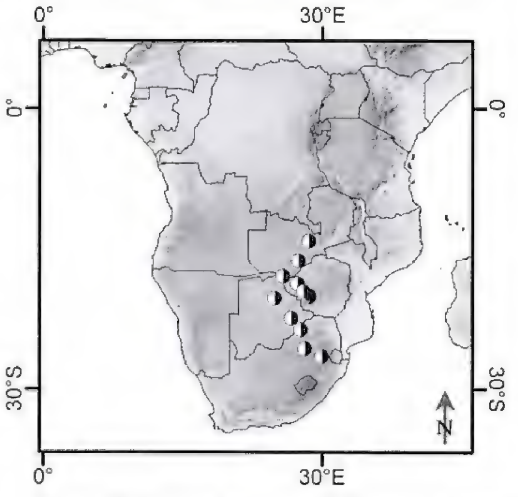


FIGURE 236. Collecting localities of *Tachysphex miniatulus*.

COLLECTING PERIOD.— 24 March (males) through 4 August (females).

GEOGRAPHIC DISTRIBUTION (Fig. 236).— Zambia, Zimbabwe, Botswana, northern South Africa.

RECORDS.— **BOTSWANA**: 25 mi W Gweta at 20°17′S 24°54′E (2 ♂, BMNH), Serowe: Farmers Brigade (1 ♂, PPRI). **SOUTH AFRICA**: **Gauteng**: Pretoria North (1 ♀, AMG). **Mpumalanga**: Ermelo (2 ♀, AMG). **Northern Province**: Ellisras (1 ♀, 1 ♂, AMG). **ZAMBIA**: **Central Province**: 25 km SSW Kapiri Mposhi at 14°10′S 28°36′E (1 ♂). **Southern Province**: Monze (1 ♂, USU). **ZIMBABWE**: Bulawayo (2 ♀, SAM), Bulawayo airport (1 ♀, 1 ♂), Gwaai River (1 ♀, SAM), Mletengluf (1 ♀, SAM), 11 km NE Nyamandhlovu (4 ♂), Sawmills (4 ♀, 2 ♂, SAM, including lectotype and paralectotype ♀), Umguza River (2 ♀, SAM), Victoria Falls (3 ♂).

Tachysphex mkomazi Pulawski, sp. nov.

Figures 231, 237.

DERIVATION OF NAME.— Named after the Mkomazi village and Mkomazi Game Reserve, Tanzania, where most specimens have been collected; a noun in apposition to the generic name.

RECOGNITION.— *Tachysphex mkomazi* has a unique galea (Fig. 237c): the crease is oriented longitudinally and separates the main, sparsely punctate area from the narrow, densely punctate, posterior area. The species also has a flat labrum, uniformly, densely punctate forefemur, vertically oriented hindwing vein cu-a, and sternum I without longitudinal carina. Additionally, the mesopleuron is markedly microsculptured, dull, with inconspicuous punctures, the propodeal side is unridged, the gaster all black, and the legs are largely red. In the female, the clypeal lip has an adlateral incision that separates two teeth (Fig. 237a). In the male, the inner mandibular margin is widely emarginate distad of tooth (Fig. 237b), similar to that of *vulneratus*.

DESCRIPTION.— Galea slightly longer than wide in profile, equal to about 0.8 of scape, with longitudinally oriented crease, finely, sparsely punctate except for narrow, densely punctate area posterad of crease (Fig. 237c). Scutal punctures about 2–3 diameters apart on disk in female, about one diameter apart in male; interspaces microsculptured. Mesopleuron microsculptured, dull, with minute, evanescent punctures that are several diameters apart. Propodeal dorsum evenly microareolate, side uniformly microsculptured. Hindcoxal dorsum with inner margin carinate, carina somewhat expanded basally.

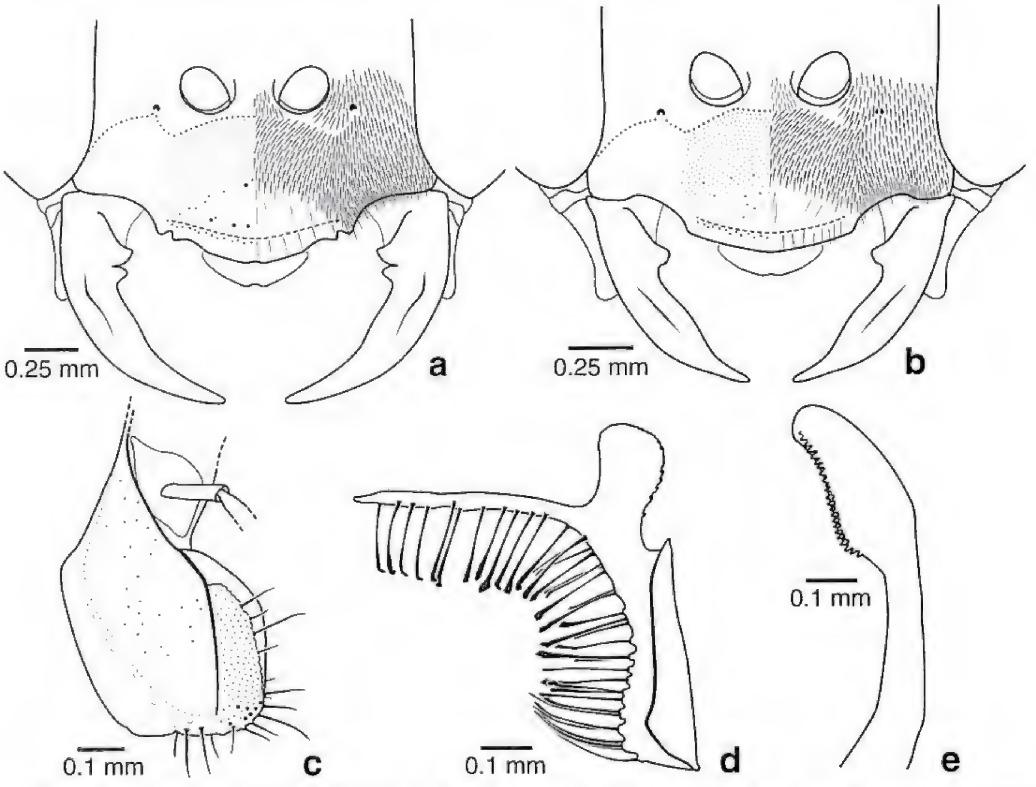


FIGURE 237. *Tachysphex mkomazi* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – female galea; d – volsella; e – penis valve.

Setae erect on postocellar area but no longer than midocellar diameter; appressed on scutum; straight (except angled at apex), up to 1.5 × midocellar diameter on each side of oral fossa next to occipital carina; all oriented posterad on propodeal dorsum

Head and thorax black, mandible reddish subbasally. Frontal setae golden in both sexes, also clypeal setae golden in male. Wing membrane slightly yellowish; costal vein of forewing yellowish brown, subcostal vein brown. Femora red except forefemur black basally, tibiae and tarsi red. Gaster black. Terga I–IV in female, I–III in male, silvery fasciate apically.

♀.— Clypeus (Fig. 237a): bevel shorter than basomedian area; lip free margin arcuate mesally, concave adlaterally, with lateral, narrow incision that separates two teeth. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 2.3 × apical width. Dorsal foretibial surface with three spines; outer surface with two spines. Forebasitarsus with 11 rake spines on one leg, 13 on other. Tarsomeres IV as long as wide. Apical tarsomeres each with two small, preapical spines on venter (only one spine on forebasitarsus), lateral margins each with one or two small spines at about two thirds of length; apicoventral margin markedly arcuate. Outer claw in each pair minimally shorter and thinner than inner claw (opposite on foretarsus). Apical depression of tergum V setose throughout. Pygidial plate with well-defined punctures that average many diameters apart, interspaces unsculptured. Length 9.9 mm.

♂.— Mandible: trimmal carina with tooth, widely and shallowly emarginate distad of tooth (Fig. 237b). Clypeus (Fig. 237b): bevel somewhat longer to somewhat shorter than basomedian

area, with most punctures about one diameter apart, but up to several diameters apart near lip; lip free margin evenly arcuate, not emarginate mesally, with well-defined corner and minute carina emerging from each corner (carina not extending into bevel); distance between corners 1.3–1.5 × distance between corner and orbit. Width of postocellar area 0.4–0.5 × length. Dorsal length of flagellomere I 1.7–1.8 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venter of tarsomeres V with one preapical spine. Length 9.0–10.3 mm. Volsella and penis valve: Figs. 237d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 231).— Southeastern Kenya, northeastern Tanzania.

RECORDS.— HOLOTYPE: ♀, **TANZANIA**: **Tanga Region**: 2 km NE Mkomazi at 4°37.8′S 38°05.5′E, 29–31 Dec 2002, M.A. Prentice (CAS). PARATYPES: **KENYA**: **Coast Province**: Voi at 3°24.0′S 38°33.2′E, 21–22 May 2000, V.F. Lee and WJP (1 ♂). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post, 2–8 Dec 2002, M.A. Prentice (1 ♂). **TANZANIA**: **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya Camp at 3°58′S 37°48′E, 29 Jan–19 Mar 1996, S. van Noort (2 ♂; 3 ♂, SAM)

Tachysphex mocsaryi Kohl

Figures 238, 239.

Tachysphex mocsaryi Kohl, 1884:367, ♀ (as *Mocsáryi*, incorrect original capitalization and diacritic mark). Lectotype: ♀, Hungary: no specific locality (NHMW), designated by Dollfuss, 1989:13, examined before 1971.— Kohl, 1885:351 (in key to Palearctic *Tachysphex*), 359 (in revision of Palearctic *Tachysphex*); Kohl and Handlirsch, 1889:278 (Turkmenistan); Dalla Torre, 1897:681 (in catalog of world Hymenoptera); Mocsáry, 1897:77 (Hungary); Gussakovskij, 1935:427 (Tajikistan); de Beaumont, 1947c:664 (description of ♂); Bajári, 1957:52, 55 (in key to Hungarian Sphecidae); de Beaumont, 1961b:275 (Afghanistan), 1962:25 (Spain), 39 (comments); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); Scobiola-Palade, 1966:392 (Romania; as *mocsary*); Balthasar, Hrubant, and Hrubant, 1967:171 (Bulgaria); Pulawski, 1967:394 (Turkey); Scobiola-Palade, 1967:161 (Romania), 1968:142 (Romania); Pulawski, 1971:312 (in revision of Palearctic *Tachysphex*); Balthasar, 1972:269 (in Sphecid Fauna of Czechoslovakia: may be expected in the country); Myartseva, 1972a:79 (Turkmenistan); Scobiola-Palade, 1972:150 (Romania; as *mocsary*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Scobiola-Palade, 1974:145 (Romania); Bohart and Menke, 1976:275 (listed); Kazenas, 1978:113, 126 (in key to Sphecidae of Kazakhstan and Central Asia); Józan, 1983:99 (Hungary), 1985:57 (Hungary), 83 (ecological and zoogeographic characteristics); Scobiola-Palade, 1985:96 (Romania); Islamov, 1986:527 (Uzbekistan); Józan, 1986:370 (Hungary); Gayubo and Mingo, 1988:80 (Spain); Dollfuss, 1989:13 (lectotype in NHMW); Pádr *in* Šedivy, 1989:168 (in checklist of Czechoslovakian Sphecidae); Józan, 1992:173 (Hungary), 1995:104 (Hungary); Ivanov and Ljubomirov, 2001:211 (Bulgaria); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia); Schmidt and Bitsch *in* Bitsch et al., 2001:258 (in Sphecid Fauna of Western Europe); Kazenas, 2002a:71 (geographic distribution, collecting localities in Kazakhstan).

Tachysphex algirus Kohl, 1892:215, ♀ (as *algira*, incorrect original termination). Holotype or syntypes: ♀, Algeria: Oran (NHMW), examined before 1971. **New synonymy**.— Dalla Torre, 1897:678 (in catalog of world Hymenoptera); Mercet, 1910:165 (listed from Spain); nec de Beaumont, 1947c:664 (as *pygidialis* ssp. *algira* = *Tachysphex incertus*).— As *Tachysphex mocsaryi algirus*: Pulawski, 1971:315 (new status, in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:275 (listed).

Tachysphex mocsaryi maroccanus de Beaumont, 1947c:665, ♀, ♂ (as *maroccana*, incorrect original termination). Holotype: sex not indicated, Morocco: Mogador area (BMNH), examined in 1974. Synonymized with *Tachysphex mocsaryi algirus* by Pulawski, 1971:315.— de Beaumont, 1950a:405 (Algeria), 1955:178 (Morocco).

RECOGNITION.— *Tachysphex mocsaryi* has the labrum convex and protruding beyond the clypeal free margin, the galea longer than wide in profile, and in many specimens the propodeal

side with ridges behind spiracle. In addition, the setae are appressed on the vertex and scutum, no longer than one midocellar diameter on each side of the oral fossa, and oriented posterad on the propodeal dorsum.

The female can be recognized, in addition to the above characters, by the combination of a laterally emarginate clypeal lip (emargination reduced in some specimens) and a largely or all punctate and setose apical depression of tergum V.

In the male, the outer apical spine of foretarsomere II is either longer (Asian, European, and several African specimens) or shorter (many African specimens) than foretarsomere III and terga I–III are fasciate. Specimens with long apical spine of foretarsomere II can be recognized by their narrow, elongate dorsal volsellar process (Figs. 238c, d) in combination with the following: setae appressed or nearly so and shorter than midocellar diameter on postocellar area, not longer than midocellar diameter adjacent to oral fossa next to occipital carina, oriented posterad on propodeal dorsum; trimmal carina of mandible sharp between tooth and apex; forefemoral notch with microscopic, erect setae; and wing membrane yellowish. Specimens with a short apical spine of foretarsomere II resemble *brevipecten* and *incertus*, but unlike *brevipecten* the galea is densely punctate (except sparsely along the anterior margin), and unlike *incertus* the dorsal volsellar process is obtuse, not pointed (Figs. 238c, d).

Justification of new synonymy.— The two currently recognized subspecies of *mocsaryi*, *mocsaryi algirus* and *mocsaryi mocsaryi*, differ in the color of their tibiae and length of the male

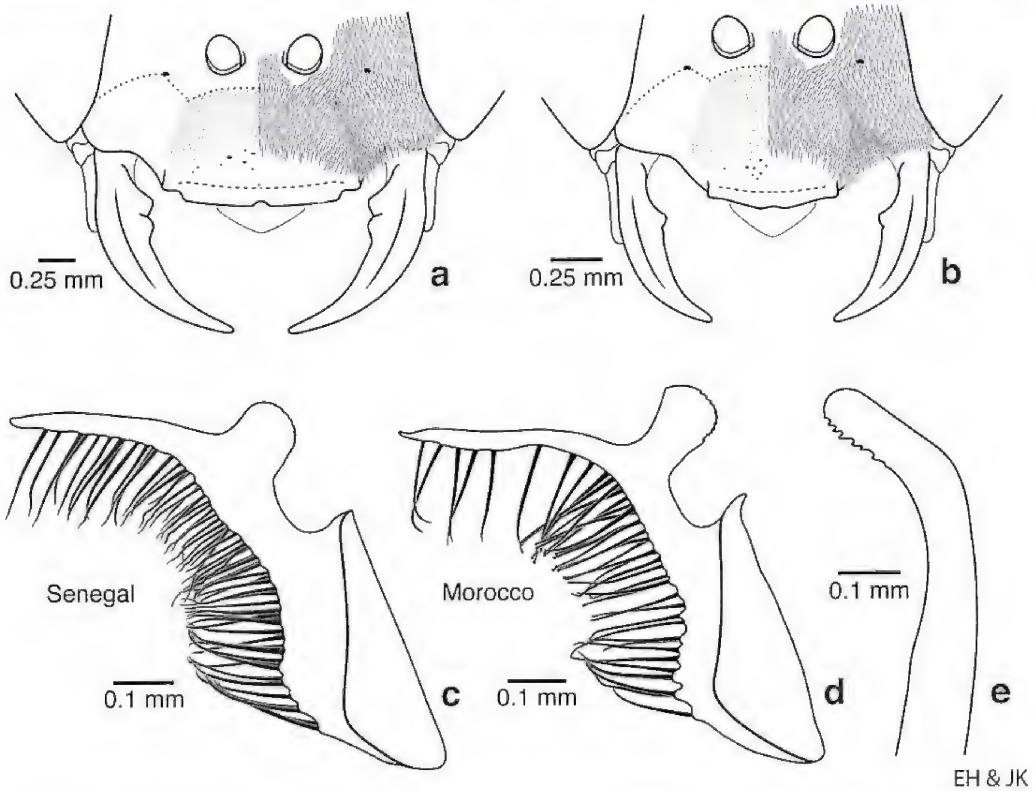


Figure 238. *Tachysphex mocsaryi* Kohl: a – female clypeus and mandible; b – male clypeus and mandible; c and d – volsella; e – penis valve.

foretarsal rake. In *mocsaryi algirus* (Algeria and Morocco), the tibiae are black in females and most males, and the outer apical spine of male foretarsomere II is shorter than tarsomere III, whereas *mocsaryi mocsaryi* (Spain to Kazakhstan) has the tibiae red and the outer apical spine of male foretarsomere III longer than foretarsomere III. Specimens from Senegal and most from Niger, however, do not fit either of the two subspecies: their tibiae are red, but the outer apical spine of male foretarsomere II is shorter than foretarsomere III. As other character combinations are also possible, I prefer to synonymize the two subspecies rather than adding to proliferation of names by recognizing the Senegalese specimens as another subspecies.

STATUS OF *TACHYSPHEX MOCSARYI OBSCURUS*.— Pulawski (1971) described *mocsaryi obscurus* from the Canary Islands, based on the male sex only. He raised *obscurus* to full species status after having examined the female (Pulawski, 1974).

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea longer than wide in profile, densely punctate in most specimens except punctures sparse near anterior margin, sparsely punctate in those from Algeria and Morocco; its length equal to 0.8–1.0 of scape. Scutal punctures minute, inconspicuous, about one diameter apart. Mesopleuron evenly microareolate. Propodeal dorsum evenly microareolate; side microsculptured, in most specimens finely ridged adjacent to metapleural sulcus, also along dorsal and posterior margins in many (at least behind spiracle); all side ridged in some specimens. Hindcoxal dorsum carinate basally.

Setae erect, no longer than one midocellar diameter on each side of oral fossa next to occipital carina; appressed on postocellar area and scutum; oriented posterad on propodeal dorsum (oriented anterad on basomedian triangle in specimen from Burkina Faso).

Head and thorax black except the following are reddish: mandible (black in apical third), clypeal bevel in females from Kazakhstan, Senegal, and Burkina Faso and in male from Senegal, scape in female from Senegal, and large portions of flagellomeres II and III in female from Senegal. Frontal setae golden in females from Europe, Kazakhstan, and Niger, with golden tinge in females from other areas, golden in most males but silvery in smallest ones. Wing membrane yellowish; costal vein of forewing yellowish brown, subcostal vein brown. Femora varying from black to red in female, black in male; tibiae and tarsi red in most specimens, but all or largely black in females and many males from Algeria and Morocco. Gastral segments I–III red in most females and remainder black (all gaster red in female from Senegal and those from Niger except one from Gaya area); all gaster black in European and most Asian males, but segments I and II red in some males from Kazakhstan and in those from Algeria and Morocco, and segments I–III red in males from Senegal and Niger. Terga I–IV in female, I–III in male, silvery fasciate apically.

♀.— Clypeus (Fig. 238a): bevel about as long as basomedian area; lip free margin arcuate, emarginate mesally and laterally (lateral emarginations inconspicuous in some specimens). Width of postocellar area 0.8–1.1 × length. Dorsal length of flagellomere I 2.0–3.1 × apical width. Forecoxa with apicomedian process in larger specimens. Dorsal foretibial surface with two or three spines; outer surface with one to three spines. Forebasitarsus with 7–9 rake spines. Inner apical spine of hindtarsomere V reaching claw base or nearly so. Apical depression of tergum V punctate and setose throughout (sparsely so in some specimens from Kazakhstan), impunctate and asetose near apical margin in some specimens from Algeria and Morocco. Pygidial plate punctate (many punctures adjacent to margin about 1–2 diameters apart in some specimens), interspaces unsculptured in most specimens, but microsculptured in those from Burkina Faso, Senegal, and most from Niger. Length 11.0–14.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 238b): bevel markedly shorter than basomedian area, delimited laterally by short, oblique carina that emerges from lip corner; lip free margin arcuate, with well-defined corner; distance between corners 1.2–1.5 × distance

between corner and orbit. Width of postocellar area 0.7–1.0 × length. Dorsal length of flagellomere I 1.7–2.25 × apical width. Forefemoral notch microscopically setose, in Asian and European specimens bottom narrow, markedly longer than wide, microsetae erect. Outer margin of forebasitarsus varying: with 3–5 rake spines (mostly four) in Asian and European specimens and some from Niger, with two or three spines in specimens from Algeria and Morocco, without preapical spines in specimens from Senegal and most from Niger (where specimens from the same locality may or may not have preapical spines); outer apical spine of foretarsomere II longer than tarsomere III in Asian and European specimens and some from Niger, but shorter in other African specimens. Length 8.0–8.3 mm. Volsella and penis valve: Figs. 238c-e.

GEOGRAPHIC DISTRIBUTION (Fig. 239).— Spain, southeastern Europe north to Hungary and Slovakia, Turkey, Israel and Palestine, Afghanistan, Central Asia (Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan), and in Africa: Libya to Morocco, Senegal, Burkina Faso, and Niger.

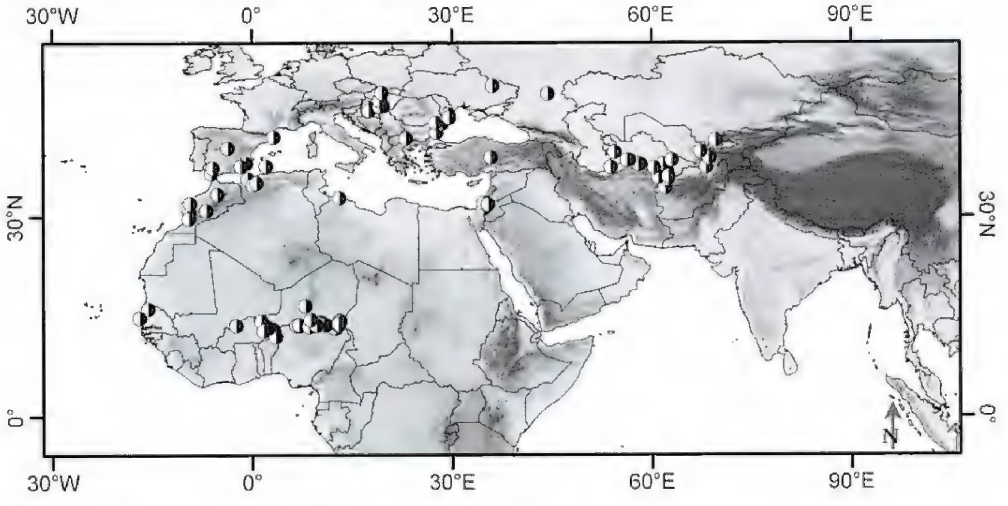


FIGURE 239. Collecting localities of *Tachysphex mocsaryi*.

RECORDS (from Pulawski, 1971, if not indicated otherwise).— **AFGHANISTAN**: Herat (de Beaumont, 1961b). **ALGERIA**: Hammam Lif, Oran, Saïda SE Oran (de Beaumont, 1950a), Tagremaret (1 ♂). **BULGARIA**: Kresna Gorge at 41°48′N 23°10′E (Ivanov and Ljubomirov, 2001), Slanchev Bryag near Nessebyr (Balthasar, Hrubant, and Hrubant, 1967). **BURKINA FASO**: 4 km NW Ouahigouya at 13°37.0′N 2°27.6′W (1 ♀). **HUNGARY**: Barcs (Józan, 1983, 1985), Boronka-melléki: Galabárdpuszta (Jozan, 1992), Dabas (Mocsáry, 1897), Duna-Drava National Park: Darány (Józán, 1995), 15 km SW Kecskemet (1 ♀, 1 ♂), Kiskunság National Park: Ágasegyháza, Bugac, and Csévharaszt (Józan, 1985), Kiskunságon in Alföld = Great Hungarian Plain (Bajári, 1957), Matyásföld (Mocsáry, 1897). **ISRAEL**: Beersheba, Benjamina 40 km S Haifa, Jericho (de Beaumont, 1947c), Wadi Quilt (de Beaumont, Bytinski-Salz, and Pulawski, 1973). **KAZAKHSTAN** (K = Kazenas, 2002): **Aktöbe**: Bolshyie Barsuki sands near Chelkar, mouth of Chit-Irghiz river circa 100 km NNE Chelkar (3 ♀, 2 ♂). **Almaty**: 20 km N village Aidarly in Sarytaukum Desert (K), Bakanas (K), 15 km SE Borandysu (K), 35 km N Chilik (K), 45 km E Chingil'dy (K), 35 km NW, 5–10 km S, and 8–10 km SE Kapchagai (K), 3 km S Talgar (K). **Astana**: Kokshetau on Terisakkan River. **Atyraū**: Kharkin 180 km N Atyraū. **East Kazakhstan**: 12 km SW Buran (K), 7–10 km N and 8 km NW Semey (K). **Pavlodar**: 6 km SE Sheherbakty (1 ♀, 1 ♂). **Qostanai**: Zhalanash (K). **Qyzylorda**: 6 km W village Amanotkel' at about 46°N 61.5°E (K). **South Kazakhstan**: 5–8 km SW Chardara (K), 5 km SW Koksu (K), Lengher (K), 10 km S Syutkent on Syr-Darya River = 140 km SWW Chimkent at about 42°N 68°E (K). **West Kazakhstan**: Yanvartsevo 70 km E Oral (1 ♀, 1 ♂). **Zhambyl**: 30 km SW Chu (K), 2 km S, 4 km SE, and 50–70 km NW Furmanovka (K), Muyunkum sands (K). **Location unknown**: 8 km SE Bol'shaya Vladimirovka (K), 7 km SE

Kanonerki (K), 40 km NE Kokpekty (K), 10 km NE Malaya Vladimirovka, Semenovka (K), 23 km NW Semenovka (K), Tamdy in Dzhambeit district (K), 5 km NE Ul'ken-Karatal (K). **LIBYA**: **Tripolitania**: Gargaresc. **MOROCCO**: Azrou (1 ♂), Immouzzer (1 ♀), Marrakech: Oued Tensift (1 ♂), Mogador district (1 ♀), Ouarzazate (1 ♀), Tiznit: Assaka (de Beaumont, 1955). **NIGER**: **Agadez Region**: 30 km S Agadez at 16°39.0′N 7°56.9′E (1 ♂). **Diffa Region**: 54 km NE Diffa at 13°42.3′N 12°55.8′E (1 ♂), 71 km NE Diffa at 13°53.0′N 12°56.3′E (1 ♀, 3 ♂), 2 km S Diffa at 13°17.4′N 12°36.7′E (1 ♀), 20 km SW Diffa at 13°13.1′N 12°25.9′E (5 ♂), 15 km W Goudoumaria at 13°42.8′N 11°03.9′E (1 ♂), 3 km NNE Nguigmi at 14°16.5′N 13°06.9′E (2 ♂), 13 km NNE Nguigmi at 14°23.0′N 13°08.0′E (1 ♂), 3 km SW Nguigmi at 14°15.0′N 13°04.9′E (1 ♀), 13 km SW Nguigmi at 14°10.3′N 13°01.3′E (5 ♂), 34 km SW Nguigmi at 13°58.8′N 12°58.2′E (1 ♂), 42 km SW Nguigmi at 13°54.5′N 12°56.5′E (4 ♂). **Dosso Region**: 5 km E Birnin Gauré at 13°05.6′N 2°57.1′E (5 ♂), 13 km S Dosso at 12°56.6′N 3°11.0′E (2 ♂), 6 km N Gaya at 11°55.9′N 3°29.4′E (1 ♀). **Maradi Region**: 8 km W Guidan-Roumji at 13°38.2′N 6°38.2′E (1 ♂), 15 km NNW Maradi at 13°37.9′N 7°03.0′E (1 ♂), 17 km NNW Maradi at 13°38.7′N 7°02.6′E (2 ♂), 22 km NNW Maradi at 13°42.0′N 7°01.6′E (1 ♂), 23 km NNW Maradi at 13°42.3′N 7°01.4′E (1 ♀, 4 ♂). **Niamey Region**: 12 km NW Niamey at 13°35.9′N 1°59.2′E (2 ♂). **Tillabéri Region**: 5 km NW Kollo at 13°21.6′N 2°16.4′E (5 ♂), 2 km SE Kollo at 13°19.6′N 2°19.9′E (1 ♂), 8 km SE Kollo at 13°16.4′N 2°22.0′E (1 ♂), 15 km NW Tillabéri at 14°17.3′N 1°20.5′E (2 ♂), 24 km SSW Torodi at 12°53.4′N 1°42.4′E (1 ♀), 30 km SSW Torodi at 12°48.8′N 1°42.4′E (1 ♂). **Zinder Region**: Bosotchouwa 20 km SW Takiéta at 13°30.1′N 8°31.9′E (1 ♀, 6 ♂), 50 km E Gouré at 13°45.9′N 10°40.7′E (1 ♀), 2 km N Gouré at 14°00.2′N 10°15.0′E (2 ♂), 15 km N Gouré at 14°07.0′N 10°12.4′E (4 ♂), 18 km N Gouré at 14°08.7′N 10°11.6′E (2 ♀, 2 ♂), 17 km W Gouré at 13°52.5′N 10°09.3′E (1 ♀, 22 ♂), 21 km W Gouré at 13°51.2′N 10°07.8′E (28 ♂), 27 km W Guidiguir at 13°40.9′N 9°39.1′E (1 ♀, 4 ♂), 55 km S Tanout at 14°31.2′N 8°44.3′E (7 ♂). **ROMANIA**: Agigea near Constanța, Canaraua Fetei (Scobiola-Palade, 1967), Caraorman (4 ♀, 3 ♂), Letea Island (Scobiola-Palade, 1968, 1985), Periprava (Scobiola-Palade, 1966), C.A. Rosetti (Scobiola-Palade, 1966, 1985), Săraturile at 44°57′N 29°37′E (Scobiola-Palade, 1974). **RUSSIA**: Krasnoarmeysk (de Beaumont, 1947c, as Sarepta). **SENEGAL**: 25–35 km S Richard Toll (1 ♂; 1 ♀, 3 ♂, ZMAN), 5 km SW Thiès (1 ♀). **SLOVAKIA**: no specific locality (Pádr, 1989). **SPAIN**: **Alicante**: Orihuela (Gayubo and Mingo, 1988). **Almería**: Velez Rubio. **Cadiz**: Puerto Real (de Beaumont, 1962). **Gerona**: Estartit (1 ♂). **Madrid**: Madrid (2 ♀). **Murcia**: Lorca (1 ♀). **Sevilla**: Sevilla (1 ♂). **TAJIKISTAN**: Gushary (Gussakovskij, 1935), Koi-pyaz-tau near Kabadian, Kondara 35 km N Dushanbe (1 ♀, 2 ♂). **TURKEY**: **Kayseri**: Sultanhani (1 ♂). **TURKMENISTAN**: Askhabad, Chuli (Kohl and Handlirsch, 1889), Firyuza, Gassan-Kuli, Imam-Baba near Mary, Kalay-mor, Kara-Kala area, 40 km N Mary, Pul-i-Khatun (Kohl and Handlirsch, 1889), Repetek, Shahi-burun in Bolshiye Balkhany (1 ♀), Siunt Mountain in western Kopet Dagh, Tash-Kepri on Murgab River, Tedzhen (1 ♀). **UKRAINE**: Kuriash near Kharkov. **UZBEKISTAN**: Aksakata in Chatkal Range in Tashkent Oblast' (Islamov, 1986), Saraylaylik (Gussakovskij, 1935).

Tachysphex modestus Arnold

Figures 240–242.

Tachysphex modestus Arnold, 1924:61, ♀, ♂. Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:275 (listed); Gess, 1981:17 and 54 (South Africa, nesting behavior); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex punctiventris Arnold, 1924:65, ♂. Holotype: ♂, Zimbabwe: Filabusi (SAM), examined. **New synonym**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae), 1947:150 (description of ♀); Bohart and Menke, 1976:276 (listed).

Tachysphex dicksoni Arnold, 1962:849, ♀. Holotype: ♀, South Africa: Western Cape Province: Cape Town: Lion's Head (SAM), examined. **New synonym.**— Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex modestus* has a flat labrum (at most insignificantly convex at the very apex), galea no longer than wide in profile, and both ends of hindwing crossvein cu-a nearly equidistant from the wing base. In addition, the propodeal side is all or largely unridged, the setae

of postocellar area are shorter than the midocellar diameter, appressed in the female and either appressed or suberect in the male, those of the propodeal dorsum oriented posterad at least in apical half, tergum IV is silvery fasciate, and the apical tarsomeres have no ventral or lateral spines.

The female of *modestus* can be recognized by its unusual, widely open mandibular cleft (Fig. 240a) and an unusually short clypeal lobe (Fig. 240a), with free margin of lateral clypeal section less concave than average for the genus; in addition, the clypeal lip is arcuate (Fig. 240a) or nearly so. A similar mandible is found in the females of *mesembrius*, *plicosus*, and *waltoni*. In *waltoni*, however, the labrum is slightly convex anteriorly, the galea is longer than wide in profile, and the clypeal free margin is prominently arcuate (Fig. 413a). *Tachysphex mesembrius* and *plicosus* are markedly distinct and can be recognized by the characters given under these species.

In the male, sterna III–VI have well-defined, conspicuous punctures (markedly larger than those on sternum II), and at least their apical depressions are covered by semierect setae whose length vary from about one to about two midocellar diameters (Fig. 240c). The clypeal lip has an angulate corner (Fig. 240b), and the foretarsus has no rake.

Similar unassigned specimens.— Four females from South Africa (all BMNH) closely resemble *modestus*, but the mandibular cleft is the usual shape. They are from Aliwal North (2 ♀), Katberg, and Queenstown.

Justification of new synonymy.— The holotype of *punctiventris* is just an average male of *modestus*. The two names were published simultaneously, and acting as first reviser I select the lat-

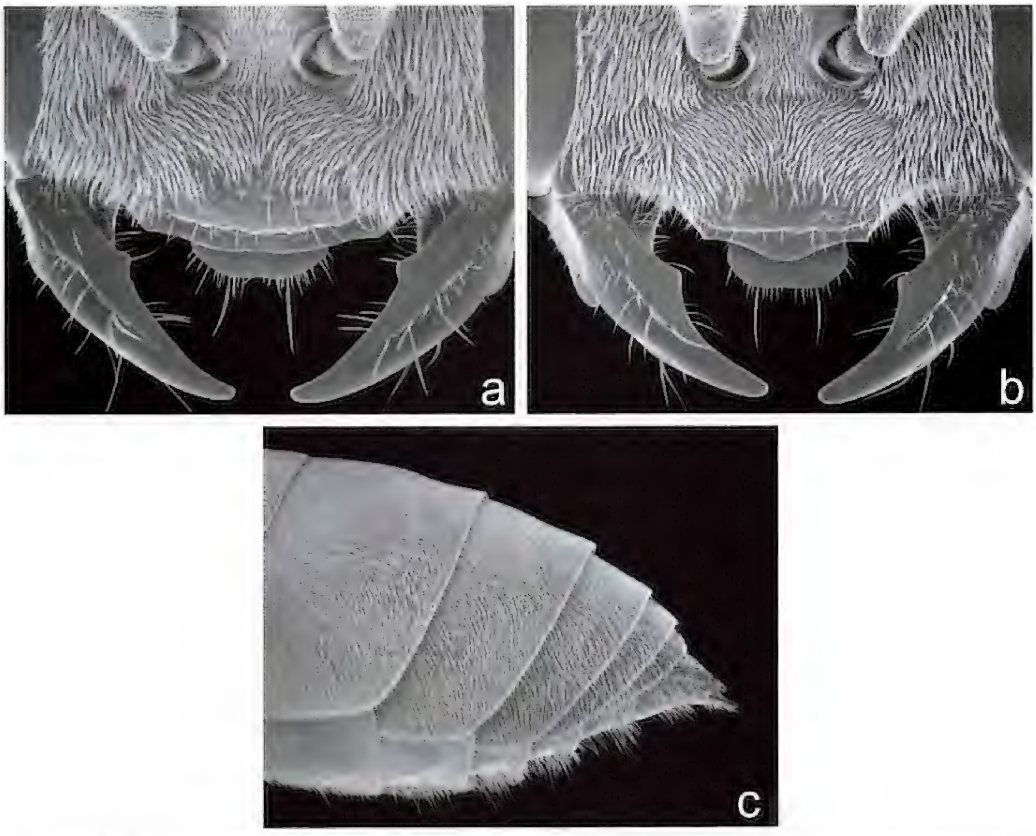


Figure 240. *Tachysphex modestus* Arnold: a – female clypeus and mandible (×47); b – male clypeus and mandible (×51); c – gastral segments III–VII of male in lateral view showing erect sternal setae (×30).

ter as valid. The holotype of *dicksoni* is a female of *modestus* with dark tibiae. This color form, which occurs in many parts of the species range, does not warrant a nomenclatural status.

DESCRIPTION.— Labrum flat in most specimens, but narrow apical portion slightly curved toward head's back (thus not parallel to clypeal lip's plane) in one ♀ from Strowan, South Africa. Scutal punctures well defined on disk, mostly no more than one diameter apart but many discal punctures averaging more than one diameter apart in most specimens from Chishawasha, Zimbabwe; interspaces shiny. Mesopleural punctures varying (see Variation below); interspaces dull. Propodeal dorsum evenly microareolate or finely rugose, in most specimens also longitudinally ridged; side microsculptured, at most with vestigial ridges along anterior, ventral, and posterior margins. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum (setae of postocellar area suberect in some males, but shorter than midocellar diameter); about as long as midocellar diameter on each side of oral fossa next to occipital carina; on propodeal dorsum oriented posterad in apical half or so and in most specimens oriented anterad in about basomedian half (all setae oriented posterad in a female from Bunt Kraal and a male from Hilton Farm, both South Africa).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate; forewing costal vein reddish, subcostal vein brown. Color of femora and gaster: see Variation below. Tibiae and tarsi red or hindtibia and hindtarsus largely black. Terga I–IV or I–V in female, I–V or I–VI in male, silvery fasciate apically.

♀.— Mandible: cleft unusually broad, widely open (Fig. 240a). Clypeus (Fig. 240a): bevel about as long as basomedian area except longer mesally; lip free margin evenly arcuate or concave adjacent to corner. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I about 1.6 × apical width. Scutellum somewhat flattened. Dorsal foretibial surface with two, occasionally three spines; outer surface with one spine near midlength. Forebasitarsus with 8–10 rake spines. Apical depression of tergum V varying from all glabrous to nearly all setose. Pygidial plate with punctures of various sizes, averaging more than one diameter apart (many diameters apart in some females); interspaces unsculptured or aciculate. Length 7.5–11.2 mm.

♂.— Mandible: trimmal carina with prominent tooth, without cleft, markedly concave between tooth and apex (Fig. 240b). Clypeus (Fig. 240b): bevel shorter than basomedian area; lip free margin arcuate or sinuate (obtusely pointed mesally in some specimens), with well-defined corner; distance between corners 0.9–1.2 × distance between corner and orbit. Width of postocellar area 0.8–1.1 × length. Dorsal length of flagellomere I about 1.5 × apical width, equal to 0.8 of II. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Punctures of sterna III–VI conspicuous, markedly larger than those on basal half of sternum II; apical depressions with suberect setae whose length varies from about one to about two midocellar diameters (Fig. 240c); all sternal surface with suberect setae in single ♂ from Springbok. Length 5.3–8.0 mm. Volsella and penis valve: Fig. 241.

VARIATION.— The males from 2 km S Voi and Taita Discovery Centre, Kenya, and from Mabokweni area, Tanzania, are unusual in hav-

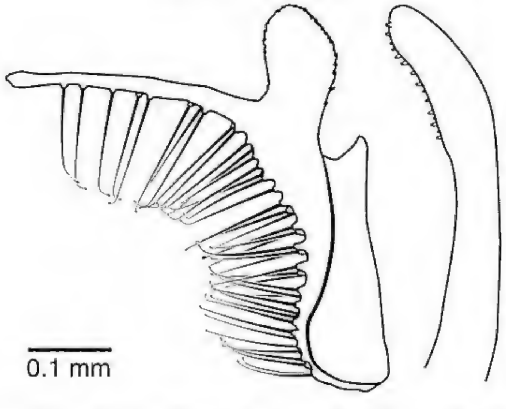


FIGURE 241. *Tachysphex modestus* Arnold: volsella and penis valve.

ing the trimmal carina broadly emarginate just distad of tooth, as in some *consocius* (see Fig. 98b). Unlike the usual specimens, the tooth is asymmetrical, with its distal margin almost perpendicular to the mandibular margin.

Mesopleural punctures are minute and inconspicuous in most specimens, but well defined and relatively large in those from Chishawasha, Zimbabwe, and the single pair from Lubumbashi area, Zaire.

The femora and gaster are black in individuals from southern Africa (including Zambia and Zimbabwe) and also Tanzania, although the pygidial plate is reddish in some females. The femora, however, are red in the specimens from Chishawasha (except forefemur black basally and midfemur black basodorsally in some males), the pair from Lubumbashi (forefemur largely black basally), and the single female from Togo (forefemur black dorsally). The gaster is all red in the single female from Togo.

NESTING AND PREY.— Gess (1981) listed *modestus* among species that facultatively use abandoned nests of other aculeates in the ground for nesting.

The only female from Eranchi, Swaziland, is pinned with her prey, an immature, all black mantid, 12 mm long, presumably her prey. A female from Hilton Farm near Grahamstown, South Africa, is pinned with a young acridid, 8 mm long. I doubt that the prey spectrum actually includes these two orders.

GEOGRAPHIC DISTRIBUTION (Fig. 242).— Burkina Faso and Ethiopia to South Africa.

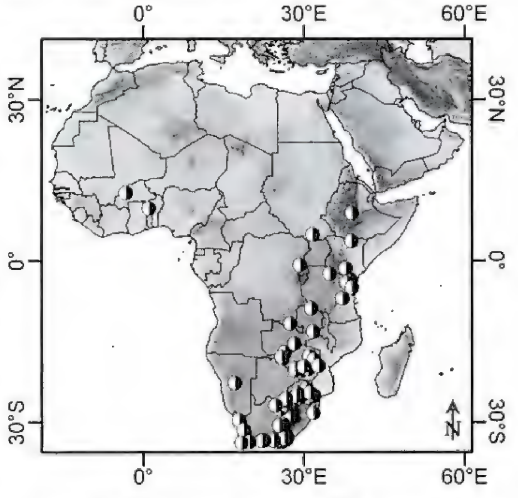


FIGURE 242. Collecting localities of *Tachysphex modestus*.

RECORDS.— **BURKINA FASO**: 28 km NE Dédougou at 12°35.5′N 3°15.6′W (1 ♂). **ETHIOPIA**: **Harerge**: Harer (1 ♂, MNHN). **Sidamo**: 26 km N Moyale (1 ♀). **KENYA**: **Coast Province**: Taita Discovery Centre (2 ♂), 2 km S Voi (1 ♂). **Eastern Province**: Tiwa (= Tiva?) River in Ukamba Highlands (2 ♂, BMNH). **LESOTHO**: Mamathes (3 ♂, AMG), Teyateyaneng (1 ♀, 1 ♂, AMG). **NAMIBIA**: **Windhoek District**: Aris 25 km S Windhoek (1 ♂). **SOUTH AFRICA**: **Eastern Cape Province**: 17 mi S Adelaide (1 ♂, AMG), Algoa Bay (1 ♂, ANSP; 1 ♂, SAM; 3 ♂, TMP), Alice (1 ♀, AMG), Alicedale (1 ♀, AMG), Belmont Valley 10 km E Grahamstown (2 ♀, 2 ♂, AMG), Boesmans River near Grahamstown (1 ♂, SAM), Carlisle Bridge (1 ♂, AMG), Clifton Farm 18 km NW Grahamstown (12 ♀, 9 ♂, AMG), Elandsheuwels Farm 40 km W Steytlerville (4 ♀, 2 ♂, USU), Fort Beaufort: "Umdala" (1 ♂, SAM), Fort Brown (1 ♀, AMG), Fort Willshire near Alice (1 ♀, 1 ♂, AMG), Grahamstown (1 ♀, AMG; 1 ♀, 3 ♂, PMA), Grahamstown: Bunt Kraal (2 ♀, AMG), 17 mi NW Grahamstown (1 ♂, AMNH), 18 km WNW Grahamstown: Hilton Farm (1 ♂; 12 ♀, 14 ♂, AMG; 1 ♂, PMA), Hankey (1 ♂, PPRI), Howison's Poort 6 km WSW Grahamstown (1 ♀, AMG), Katberg (1 ♀, BMNH), Kirkwood (2 ♀, OÖLM), Middelburg Division (1 ♀, SAM), 2 km N and 6 km N Steytlerville (2 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm (1 ♀, USU), 40 km W Steytlerville at 33°16′S 23°55′E (1 ♀, CSE), Strowan Farm 5 air km W Grahamstown (10 ♀, 6 ♂, AMG), Table Farm 10 km NW Grahamstown (4 ♀, 1 ♂, AMG), 37 km NW Willowmore in Grootrivierberg Range (1 ♀, USU), Vlakwater 27 air km NW Grahamstown (3 ♀, AMG). **Free State**: Bothaville (1 ♀, TMP), Caledon River between Bethulia and Aliwal North (2 ♀, SAM), Chicago Farm in Lindley District at 28°03′S 27°59′E (1 ♀, 1 ♂, AMG), Kroonstad (1 ♀, 1 ♂, AMG; 1 ♂, AMNH), Marquard (1 ♀, AMG), Tussen Die Riviere Game Reserve (1 ♂). **Gauteng**: Edenvale (2 ♂, AMG), Hartbeeshoek Radio Station ca 45 km WSW Pretoria at 25°53′S 27°41′E (10 ♀, 7 ♂), Pretoria (1 ♀, AEI), Pretoria: Faerie Glen at

25°46′S 28°17′E (4 ♀, 3 ♂), Pretoria: Lynnwood at 25°48′S 28°22′E (2 ♀), Rietvlei (= van Riebeck) Nature Reserve at 25°52′S 28°16′E (1 ♀), Roodeplaat (1 ♀, PPRI), Silverton (1 ♀, AMG), Tswaing (2 ♀, 1 ♂; 2 ♀, PPRI). **Kwazulu-Natal**: Umfolozi Game Reserve (2 ♀, 3 ♂, PMA). **Mpumalanga**: Barberton (2 ♀, 1 ♂; 1 ♀, 4 ♂, AMG; 1 ♀, PPRI; 1 ♀, RMNH), Loskop Dam Nature Reserve (1 ♀, 2 ♂, PPRI), Skukuza in Kruger National Park (2 ♂, PMA), Lower Sabie in Kruger National Park (1 ♀, PMA). **Northern Cape Province**: Kamiesberg to Sors Sors at 30°10′S 18°01′E (1 ♂, AMG), Springbok (1 ♂, OÖLM), VanWyksfontein 8 km W Norvalspont (2 ♀, 1 ♂, AMG). **Northern Province**: Beacon Ranch 20 km NW Gravelotte (2 ♂, PMA), Guernsey Farm 15 km E Klaserie (1 ♀, 1 ♂, PMA), 10 km SW Naboomspruit (8 ♀, 4 ♂, FSCA), Rust de Winter (2 ♂, AMG). **North-West Province**: Bloemhof (1 ♂, AMG), Klerksdoorp (1 ♀, AMG), Lichtenburg (1 ♀, TMP), Swartruggens (1 ♀, AMG), Vryburg (1 ♀, AMG). **Western Cape Province**: Cape Town (1 ♀, SAM, holotype of *dicksoni*; 1 ♀, USNM), Clanwilliam Dam: Caleta Cove at 32°14′S 18°55′E (1 ♀, AMG), Kobee 10 km NE Vanrhynsdorp (1 ♂, OÖLM), 3 km S Meringspoort at 33°28′S 22°32′E (1 ♂), Oudtshoorn (1 ♀, PMA), 5 km W Robertson (2 ♂), Sea Point (1 ♂, BMNH). **SUDAN**: Juba (2 ♂). **SWAZILAND**: Eranchi (1 ♀, AMG). **TANZANIA**: **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya (13 ♀, 11 ♂, SAM) and Kikolo Plot (1 ♂, SAM). **Mara Region**: Seronera in Serengeti National Park (1 ♀, 1 ♂). **Morogoro Region**: 62 road km SW Morogoro (1 ♂). **Tanga Region**: 10 km WNW Mabokweni (2 ♀, 2 ♂). **TOGO**: Niamtougou (1 ♀). **ZAIRE**: **Kivu**: Ruindi [Camp] at 0°47′S 29°17′E (1 ♂, MSNT). **Shaba**: Lubumbashi (1 ♀, MRAC), Lubumbashi: Kippo (1 ♂, FSAG). **ZAMBIA**: **Eastern Province**: 6–18 km SW Mfuwe (4 ♀, 4 ♂). **Lusaka Province**: Lusaka (1 ♂, USNM). **Northern Province**: Mbala (2 ♀, SAM, determined as *punctiventris* by G. Arnold). **Southern Province**: 7 km SW Kalomo (11 ♀, 3 ♂; 2 ♀, 1 ♂, MSNT), 9 km SW Kalomo (8 ♀, 1 ♂), 12 km SW Kalomo (1 ♂, MSNT). **ZIMBABWE**: Bulawayo (1 ♂, AMG; 1 ♂, ANSP; 6 ♀, 8 ♂, SAM, including lectotype ♀, paralectotype ♂, and 2 paratype ♂ of *modestus*; 9 ♂ TMP), Bulawayo: Forestvale (1 ♂, SAM), Bulawayo: Hillside (2 ♂), Bulawayo at Umguza River (9 ♂), Chishawasha near Harare (1 ♀, 2 ♂; 3 ♀, 15 ♂, BMNH), Filabusi: Druid Mine (3 ♂, SAM, including holotype and paratype of *punctiventris*), Great Zimbabwe near Nyanda (1 ♂, BMNH), Harare (1 ♀, BMNH), Helenvale (5 ♂, SAM), Hope Fountain (1 ♀, SAM), Kami Ruins (2 ♂), Leighwoods 52 km SW Bulawayo (1 ♂), Matetsi in Hwange District (3 ♀, 1 ♂, AMG; 2 ♀, SAM), Penkridge (1 ♀, 1 ♂, SAM), Redbank at Kami River (10 ♂; 4 ♂, NHMZ), Selukwe (2 ♀, AMG), Sly's Farm (1 ♂, SAM), Victoria Falls (2 ♂).

Tachysphex montivagus Arnold, new status

Figures 243, 244.

Tachysphex georgii montivagus Arnold, 1944:26, ♀. Holotype: ♀, Lesotho: Mamathes (SAM), examined — Bohart and Menke, 1976:274 (listed).

Recognition.— *Tachysphex montivagus*, an endemic of the Drakensberg Mountains, has the labrum convex and protruding beyond the clypeal free margin, galea in profile longer than wide, upper metapleural pit oblong, propodeal side markedly ridged, and male sterna V and VI each with subbasal, erect fringe of agglutinated setae (fringes may be invisible when sterna are contracted). In addition, setae are straight on the lower gena and appressed on the postocellar area. *Tachysphex montivagus* differs from other such species in having most setae on the propodeal dorsum diverging laterad or posterolaterad (rather than anterolatedad).

In addition, the female of *montivagus* resembles *pentheri* in having non-expanded lateral margins of foretarsomeres I and II, but has the mid- and hindtibiae black and the pygidial plate microsculptured and dull between punctures. In *pentheri* the tibiae are all or largely red (only the midtibia is largely red in some females), and the pygidial plate is shiny and unsculptured between punctures. In the male, the lateral margin of the clypeal lip is well defined (Fig. 243b), as in *pentheri*, but the lateral prong of sternum VIII is not incised and mid- and hindtibiae are black or midtibia is partly reddish (in most *pentheri*, the lateral prong of sternum VIII is incised on the inner side and the tibiae are all red).

Justification of species status.— *Tachysphex montivagus* was described as a subspecies of

georgii, but several structures (particularly the male sternal fasciae and shape of the volsella) demonstrate that it is a full species related to *aethiopicus* and *pentheri*, not to *georgii*.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea microsculptured and with a few, sparse punctures, as long as scape in female, as 1.2 of scape in male. Scutal punctures fine, no more than one diameter apart. Mesopleuron dull, microsculptured, with minute, ill-defined punctures. Propodeal dorsum evenly microareolate; side ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect on each side of oral fossa next to occipital carina, shorter than midocellar diameter; appressed on postocellar area and scutum; most setae diverging laterad or posterolaterad on propodeal dorsum (Fig. 243c).

Head, thorax, and femora black, mandible reddish except apically. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal vein of forewing brown, subcostal vein dark brown. Foretibia red except outer surface dark in female and some males, all red in many males; mid- and hindtibiae black, midtibia with reddish zones in some males. Foretarsus red, mid- and hindtarsi reddish apically. Gastral segments I and II red in most females (I–III in some), remainder black; male gaster black. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 243a): bevel longer than basomedian area; lip free margin arcuate, shallowly emarginate mesally, sinuous laterally. Width of postocellar area 1.2–1.3 × length. Dorsal length

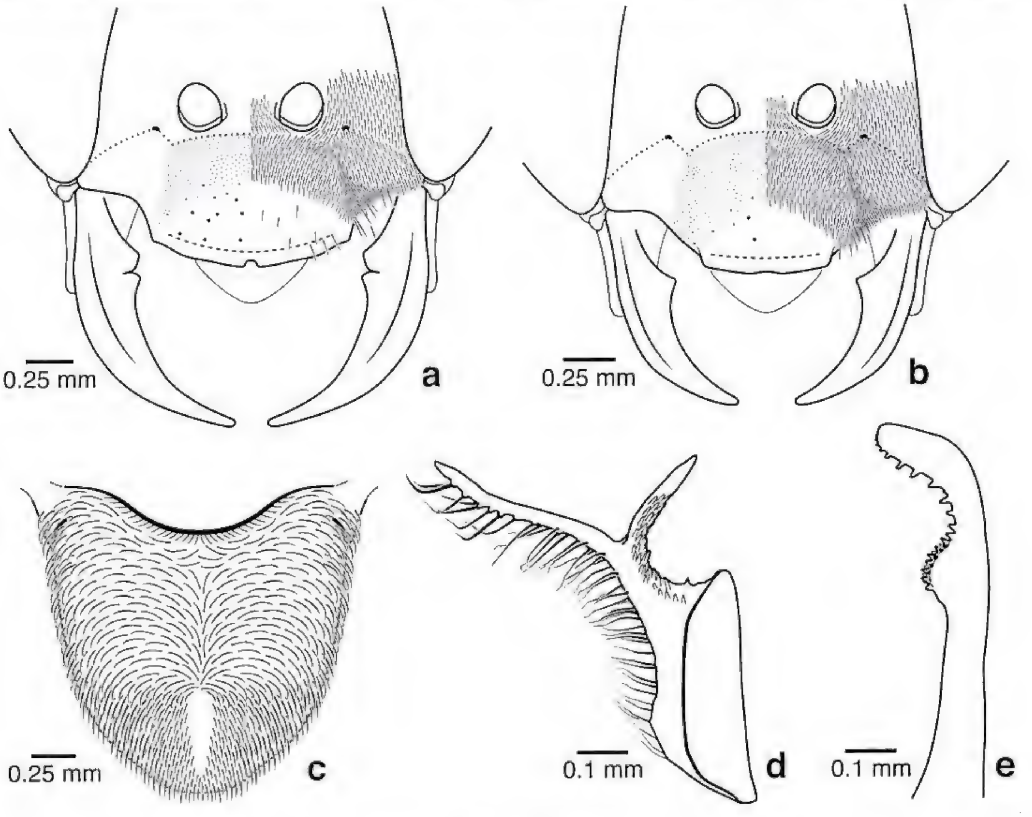


Figure 243. *Tachysphex montivagus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum showing setal pattern; d – volsella; e – penis valve.

of flagellomere I 2.2–2.5 × apical width. Dorsal foretibial surface with two spines; outer surface with one or two spines. Forebasitarsus with six or seven rake spines. Apical depression of tergum V varying from punctate and setose throughout to impunctate and asetose. Pygidial plate with punctures that average several to many diameters apart, interspaces dull, microsculptured (except shiny, unsculptured apically in some specimens). Length 8.3–10.7 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 243b): bevel about as long as basomedian area; lip free margin slightly arcuate, emarginate mesally in many specimens, with well-defined corner (and obtuse carina emerging from corner); distance between corners equal to distance between corner and orbit. Width of postocellar area 1.6–1.8 × length. Dorsal length of flagellomere I 1.6–1.8 × apical width. Forefemoral notch with bottom asetose. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin well defined in distal half. Sterna V and VI (except laterally) each with subbasal, erect fringe of agglutinated setae (fringes visible only when sterna are fully extended), slightly concave between fringe and hindmargin. Sternum VIII with apical margin shallowly emarginate, almost straight between lateral prongs. Length 6.5–9.0 mm. Volsella and penis valve: Figs. 243d, e.

Prey.— A female from Mamathes, Lesotho (AMG), is pinned with her prey, an acridid nymph (det. F.W. Gess).

Collecting period.— 1 January through 4 April, 1 October through 25 December.

Geographic distribution (Fig. 244).— Drakensberg Mountains of Lesotho and South Africa.

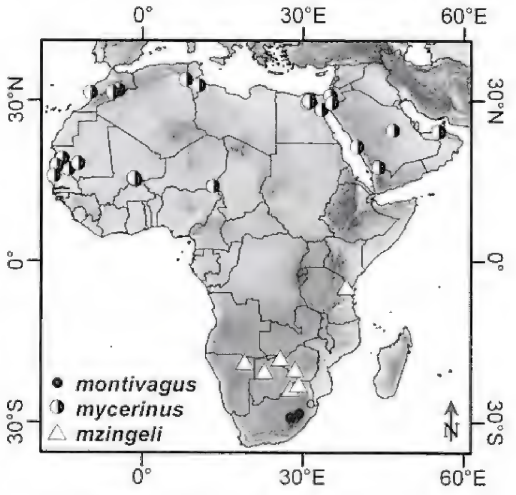


Figure 244. Collecting localities of *Tachysphex montivagus*, *mycerinus*, and *mzingeli*.

Records.— **LESOTHO**: Mamathes (6 ♀, 3 ♂; 10 ♀, 4 ♂, AMG; 5 ♀, SAM, including holotype of *georgii montivagus*), Teyateyaneng (1 ♀, 1 ♂; 1 ♀, 1 ♂, AMG). **SOUTH AFRICA**: **Kwazulu-Natal**: Van Reenen (1 ♀, BMNH).

Tachysphex mycerinus de Beaumont

Figures 244–246.

Tachysphex mycerinus de Beaumont, 1940:166, ♀, ♂. Holotype: ♀, Egypt: Cairo (Ministry of Agriculture of Egypt), not examined.— Honoré, 1942:297 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:166 (in revision of Egyptian *Tachysphex*), 1955:176 (Morocco); Pulawski, 1964:88 (Egypt), 1971:297 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:275 (listed).

Recognition.— *Tachysphex mycerinus*, a Saharan and southwestern Asian species, has a convex labrum that protrudes from beneath the clypeus and a galea that is slightly longer than the scape.

The female has a distinctive pygidial plate: the surface is shiny, unsculptured (except for minute, sparse punctures), slightly convex both transversely and longitudinally, and the lateral carina is somewhat ill defined, lower than average for the genus (Figs. 245c, d). The shape of the clypeal lip helps in recognition: the free margin is arcuate, without lateral incision or sinuosity, at most with a rudimentary median notch (Fig. 245a).

The male has an obtusely pointed clypeal lip (Fig. 245b), without even a trace of a median notch, and a distinctive volsella (Figs. 246a, b, d, e). Subsidiary recognition features are: setae of the propodeal dorsum oriented posterad at least apicomesally, tergum IV not fasciate apically, and the longest setae of the lower gena about 0.2 × basal mandibular width (a few, isolated setae may be about 0.3 ×). A similar clypeus is found in some *calidus* and *dolosus*, both of which have a different volsella, and the longest setae of the lower gena equal to 0.3–0.4 × basal mandibular width. In addition, most or all setae of the propodeal dorsum are inclined anterad or obliquely anterad in *dolosus* and many *calidus*, and tergum IV of *dolosus* has a mesally interrupted, silvery fascia.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea minutely, densely punctate (except anteriorly), as long as 1.1–1.2 of scape in female, 1.2–1.4 in male. Scutal punctures shallow, inconspicuous, about one diameter apart. Mesopleuron evenly microsculptured. Propodeal dorsum and side evenly microareolate. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area, scutum, and each side of oral fossa next to occipital carina (a few setae erect there), almost totally concealing mesopleural integument in female, partly so in male; on propodeal dorsum oriented posterad at least apicomesally (poorly preserved anteromesally in most specimens examined), oriented posterolaterad on dorsum's sides.

Head and thorax black, but the following are yellowish red: mandible (apex brown), clypeal bevel and lip, and labrum; pronotal lobe yellowish posteriorly. Frontal setae silvery in female, golden dorsally and silvery ventrally in most males, all golden or all silvery in some. Wing membrane hyaline; both costal and subcostal veins of forewing yellowish. Color of femora and gaster: see

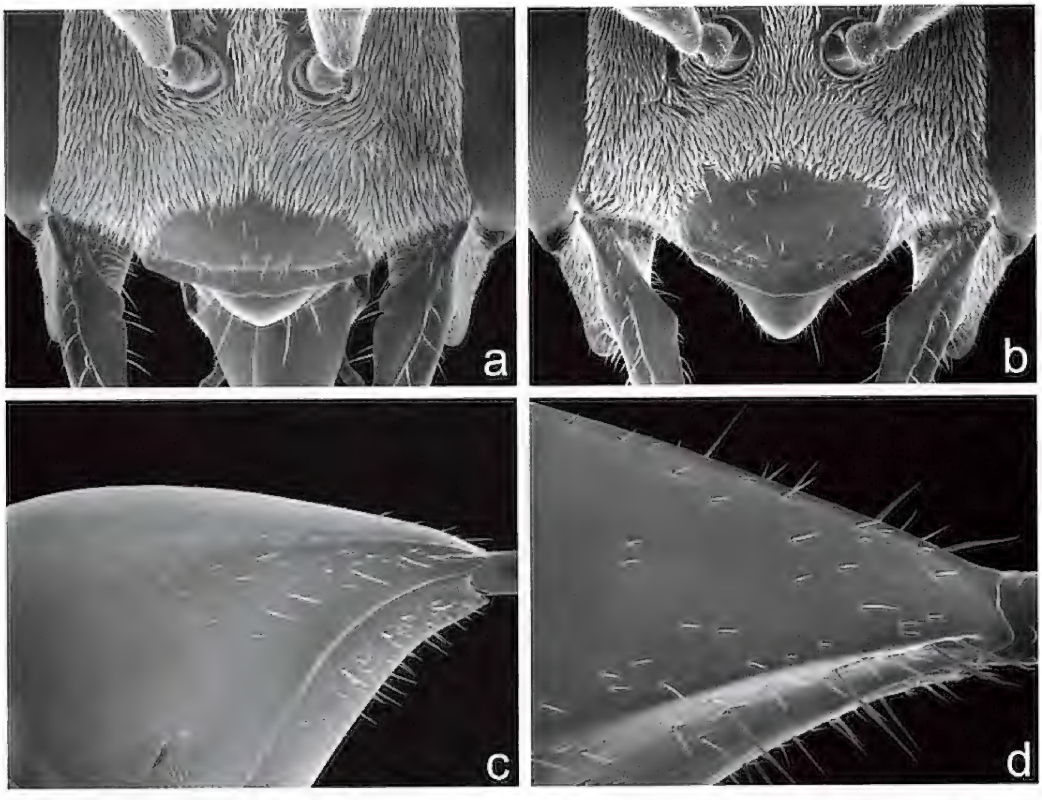


FIGURE 245. *Tachysphex mycerinus* de Beaumont: a – female clypeus (×42); b – male clypeus (×48); c – gastral segment VI of female in profile (×54); d – apical portion of female pygidial plate in lateral oblique view (×120).

below. Tibiae and tarsi red. Terga I–III silvery fasciate apically (I–IV in females from Mali).

♀.— Clypeus (Fig. 245a): bevel shorter to longer than basomedian area; lip free margin arcuate, at most with rudimentary median notch, not incised nor sinuous laterally. Width of postocellar area about 0.9 × length. Dorsal length of flagellomere I 2.4–2.7 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two spines. Forebasitarsus with 8–10 rake spines. Apical depression of tergum V densely punctate and setose throughout. Pygidial plate slightly convex both transversely and longitudinally; integument shiny, practically unsculptured except for sparse, minute, inconspicuous punctures; lateral carina lower than average for the genus (Figs. 245c, d). Length 7.0–11.0 mm. Femora and gaster all red or terga with irregular, black spots.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 245b): bevel about as long as basomedian area, in many specimens delimited lateroventrally by obtuse carina that emerges from lip corner (carina not extending beyond lip in many males); lip longer mesally than laterally, free margin obtusely angulate, with obtuse corner; distance between corners about 1.3 × distance between corner and orbit. Width of postocellar area 0.9–1.3 × length. Dorsal length of flagellomere I 1.7–2.2 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 5.0–9.0 mm. Volsella and penis valve: Fig. 246. Femora varying from all red (except basally) to all black (except apically). Gastral segments I–III red, remainder black.

GEOGRAPHIC DISTRIBUTION (Fig. 244).— Morocco to Egypt, south to Mali and Niger, also Israel, Jordan, and Arabian Peninsula.

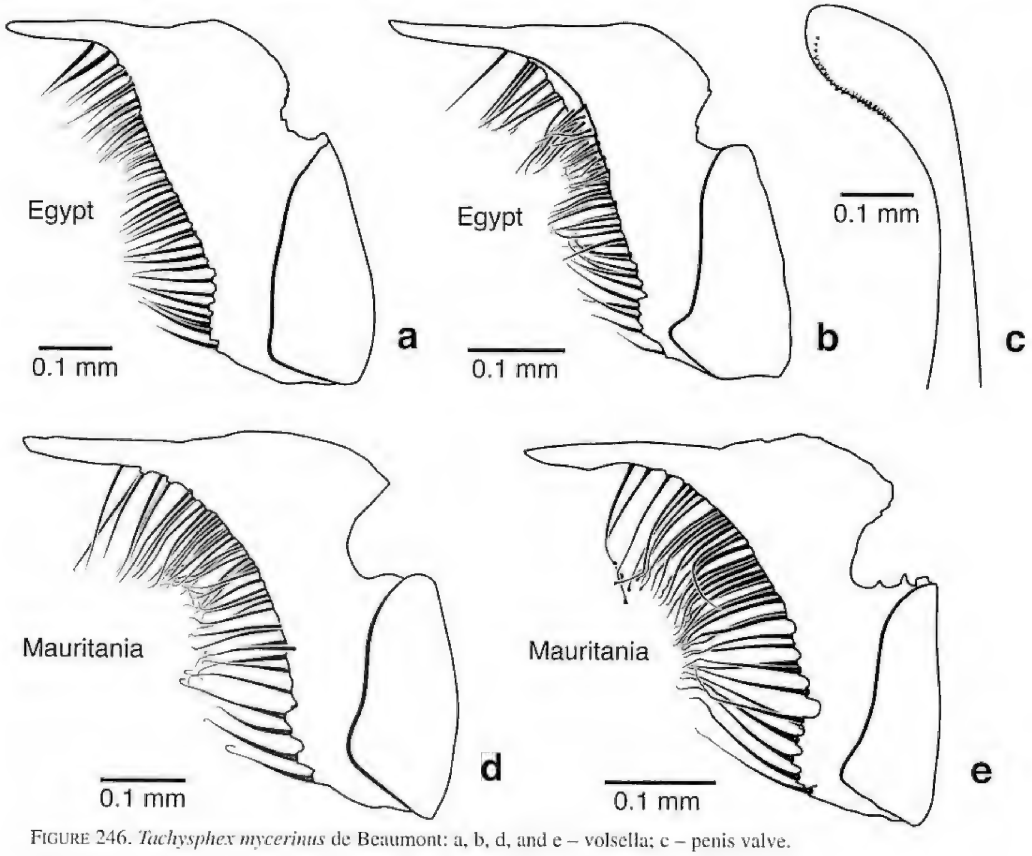


FIGURE 246. *Tachysphex mycerinus* de Beaumont: a, b, d, and e – volsella; c – penis valve.

Records.— **EGYPT**: **Al Fayyum**: Kom Osheim (2 ♀, 7 ♂). **Al Jizah** (= Ghiza): Dahshur (8 ♂), Ghiza (7 ♀, 22 ♂). **Al Qahirah** (= Cairo): Cairo (de Beaumont, 1940), Maadi (1 ♀, 5 ♂). **Sina** (= Sinai): 15 km NNW Tor (1 ♂, MSNT). **Location unknown**: Massara (de Beaumont, 1940). **ISRAEL**: Nakhal Zin at El Aqrabim (1 ♂, CSE). **JORDAN**: Wadi Rum in southern Jordan (1 ♀, OÖLM). **MALI**: 180 km SW Gao (1 ♂, MS), 10 km E Hombori (1 ♀), 25 km E Hombori (1 ♀, 5 ♂), 30 km NE Hombori (3 ♂, MS). **MAURITANIA**: 20 km NE Aleg (2 ♀), Nouakchott (1 ♂, FB), 153 km NE Nouakchott (2 ♀, 2 ♂; 1 ♀, 1 ♂, MSNT), 30 km S Nouakchott (1 ♀), Oued Henné ca 50 air km NE Moudjéria (2 ♀, MSNT). **MOROCCO** (de Beaumont, 1955): Ksar es Souk, Tinerhir, also 1 km E Essaouira at 31°30′N 9°44′W (1 ♀, CSE). **NIGER**: **Diffa Region**: 2 km ENE Nguigmi at 14°15.2′N 13°08.2′E (1 ♀). **SAUDI ARABIA**: Al Ha'ir (1 ♂, KMG), Judhaym Island 40 km S Al-Uqayr in Gulf of Salwah (1 ♀, CSE), Najran (1 ♀; 1 ♀, ZMAN), Wadi Majarish below Taif (1 ♂, KMG). **SENEGAL**: Langue de Barbarie near Saint Louis (1 ♀, KMG). **TUNISIA**: 10 km SE Tataouine at 32°51′N 10°30′E (1 ♀, CSE), Tozeur (de Beaumont, 1947a). **UNITED ARAB EMIRATES**: Al Saad (1 ♀, KMG), Bidy Al Ajam (1 ♀, KMG).

***Tachysphex mzingeli* Pulawski, sp. nov.**
Figures 244, 247.

Derivation of name.— *Mzingeli*, hunter in the Ndebele language (spoken in the type locality area); a noun in apposition to the generic name.

Recognition.— *Tachysphex mzingeli* has a flat labrum (minimally convex at the very apex), straight body setae, and both ends of crossvein cu-a of the hindwing equally distant from the wing base. In addition, the setae of the labrum free margin are short, stout, as in *aburi* and *harpax* (see Fig. 178c).

The female resembles *auropilosus* in having frontal and thoracic setae golden, tarsomeres IV roundly emarginate dorsoapically, tarsomeres V elongate (Fig. 247c), with apicoventral margin produced into a median lobe, and densely, uniformly punctate femora. Unlike that species, *mzingeli* has a uniformly punctate middle clypeal section (Fig. 247a), wings bicolored (yellow basally, brown with violet shimmer distally), and one or two spines on each lateral margin of the apical tarsomeres (Fig. 247d). In *auropilosus*, the middle clypeal section has a small, shiny, sparsely punctate area adjacent to the lip, the wings are uniformly yellow, and apical tarsomeres have 2–4 spines on each lateral margin.

The male is characterized by a golden frontal and thoracic vestiture, setae oriented posterad on the propodeal dorsum (except oriented anterad basomedially), largely red gaster and legs, and bicolored wings (yellow basally, brown with violet shimmer distally). Several species are similar, but in *mzingeli* the clypeal lobe is narrow (corners closer to each other than to respective orbit) and uniformly, densely punctate from dorsal margin to lip base (Fig. 247b), and the mesopleuron is dull, with ill-defined punctures. Morphologically, the male of *mzingeli* closely resembles *harpax* in which, however, the thoracic setae are silvery and the wings have no yellow; also, the clypeal bevel is reduced in *mzingeli*, but present in many *harpax*.

Description.— Galea longer than wide in profile, evenly microsculptured and with several large punctures, as long as 0.8 of scape. Lip free margin with short, stout setae (as in Fig. 178c). Scutal punctures minute, less than one diameter apart. Mesopleuron dull, microsculptured, with shallow, ill-defined punctures that are about one diameter apart. Propodeal dorsum evenly microareolate, side not ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I with apical depression that is bisected by ill-defined carina (carina absent in single specimen from Tanzania).

Setae suberect on each side of oral fossa next to occipital carina (setal length less than midocellar diameter), appressed on postocellar area and scutum; oriented posterad on propodeal dorsum (except oriented anterad basomedially).

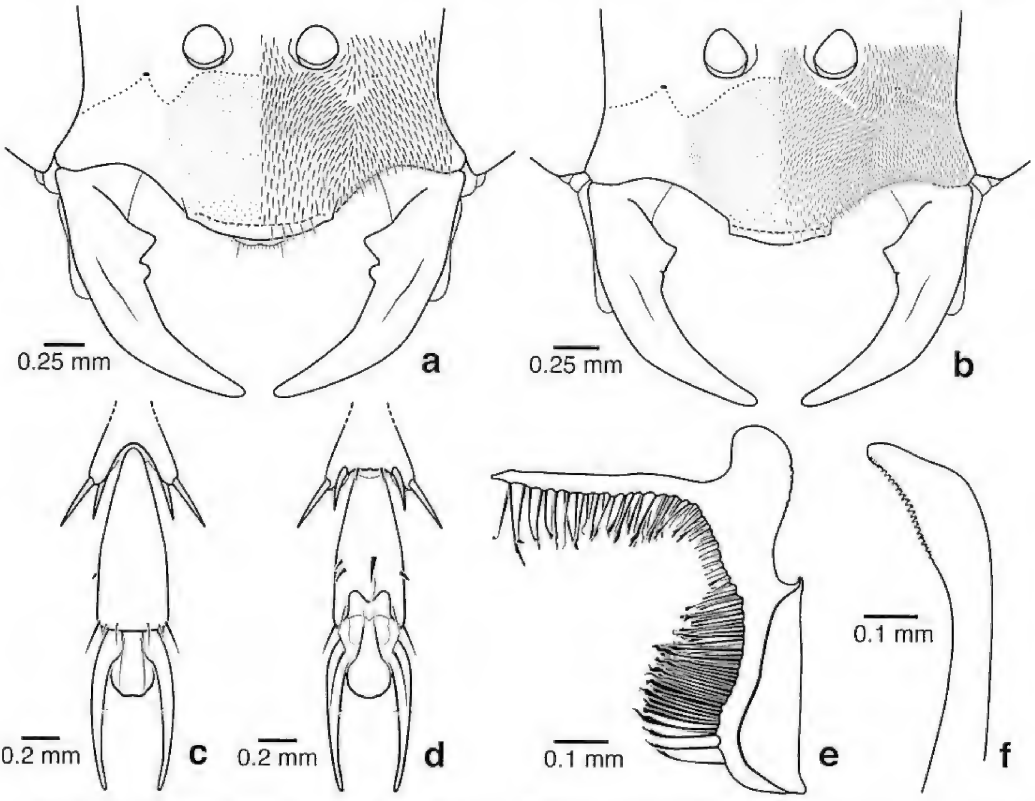


FIGURE 247. *Tachysphex mzingeli* Pulawski, sp. nov.: a – female clypeus and mandible: b – male clypeus and mandible; c – female hindtarsomeres IV and V in dorsal view; d – same in ventral view; e – volsella; f – penis valve.

Head and thorax black, mandible reddish mesally. Frontal and thoracic setae golden in both sexes. Wing membrane yellow basally, brown with violet shimmer distally; costal vein of forewing light brown, subcostal vein dark brown. Femora red except black basally or hindfemur all red; tibiae and tarsi red. Gaster mostly red basally and black or brown apically (red are segments I and II or I–III in female, I–III or I–IV in male), but all red in specimen from Tanzania, and segments I and II largely black in female from Rundu District, Namibia). Terga I–IV silvery fasciate apically (tergal setae all golden in specimen from Tanzania).

♀.— Clypeus (Fig. 247a): bevel absent, dense punctation reaching lip base; lip free margin evenly arcuate except for rudiment of lateral incision. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 2.5–2.7 × apical width. Dorsal foretibial surface with two spines; outer surface with 1–3 spines. Forebasitarsus with different number of rake spines on each leg in both specimens studied: eight and nine in one, and nine and ten in other; spines divided into basal and subapical groups. Tarsomeres IV: length 1.1 × apical width, dorsoapical emargination rounded proximally (Fig. 247c). Tarsomeres V elongate, venter with one spine near center and also one or two spines near midlength of each lateral margin; apicoventral margin produced into lobe (Fig. 247d). Claws elongate, length of arolium less than half of claw length (Fig. 247c). Apical depression of tergum V punctate and setose. Pygidial plate with punctures that average several diameters apart (several punctures one diameter apart or so); interspaces shiny. Length 13.0–13.4 mm. Volsella and penis valve: Figs. 247e, f.

♂.— Mandible: trimmal carina with tooth and rudimentary cleft. Clypeus (Fig. 247b): bevel absent (middle section densely punctate up to lip base); lip free margin arcuate, with well-defined corner; distance between corners 0.7–0.8 × distance between corner and orbit. Width of postocellar area 0.7–1.1 × length. Dorsal length of flagellomere I 1.6–1.9 × apical width, equal to 0.7 of II. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 0–2 preapical rake spines that are close to apical spine (number of spines may be different on each leg); outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with two or three preapical spines. Sternum VIII: apical margin with short, broad expansion mesally that is ill defined in specimen from Tanzania. Length 9.4–12.3 mm.

HABITAT.— The males that I collected at the Bulawayo airport, Zimbabwe, were flying around and into a large hole in the sandy soil, almost certainly dug by an aardvark, *Orycteropus afer* (Pallas). A mother wasp probably used the hole as a nesting ground some time before, and the males were apparently waiting for her daughters to emerge.

GEOGRAPHIC DISTRIBUTION (Fig. 244).— Tanzania, Botswana, northern Namibia, Zimbabwe, Mozambique, northeastern South Africa.

RECORDS.— HOLOTYPE: ♂, **ZIMBABWE**: Bulawayo airport at 20°00′S 28°38′E, 25 Jan 1995, WJP (CAS). PARATYPES: **BOTSWANA**: Lake Ngami, no date or collector's name (1 ♂, BMNH). **MOZAMBIQUE**: no specific locality, date, or collector's name (1 ♀, MNHN). **NAMIBIA**: **Rundu District**: 100 km SW Rundu, 1 Feb 1993, MS (1 ♀, 1 ♂). **SOUTH AFRICA**: **Northern Province**: Ellisras, 25 Mar 1978, H. Empey (1 ♀, AMG); Langjan Nature Reserve, 10–20 Jan 1980, G.L. Prinsloo, C. Kok, C.D. Eardley, and P. Smith (1 ♂, PPRI). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe, 11–12 July 2001, Omary S. Haji and WJP (1 ♂), 2 km NE Mkomazi, 29–31 Dec 2002, WJP (2 ♂). **ZIMBABWE**: same locality and collector as holotype, 21 Jan 1995 (3 ♂), 24 Jan 1995 (1 ♂), 29 Jan 1995 (2 ♂); Victoria Falls, 28–31 Mar 1998, WJP (2 ♂).

Tachysphex namaqua Pulawski, sp. nov.

Figures 248, 249.

DERIVATION OF NAME.— Derived from *Nama*, one of the four main San (= Bushman) tribes, and *qua*, man in the San language; a noun in apposition.

RECOGNITION.— *Tachysphex namaqua* has the fore- and midfemoral venters impunctate except for a few, sparse punctures. It can be differentiated from other such species by the following combination: femora and tibiae red, gaster red basally, setae erect but not sinuous on postocellar area (about as long as midocellar diameter), and propodeal side punctate. The female is also characterized by long apical flagellomeres (e.g., length of VIII about 2.0 × width). In the male, the free margin of the clypeal lip is arcuate, with a well-defined corner (Fig. 248b), the outer apical spine of foretarsomere II is no longer than tarsomere III, and at least some setae of sterna IV–VI are erect, up to about one midocellar diameter long.

DESCRIPTION.— Galea in female about as long as wide in profile, in male longer than wide in profile, as long as 0.6 of scape in female, equal to scape in male. Scutal punctures averaging about 2–3 or 3–4 diameters apart on disk; interspaces unsculptured. Mesopleural punctures averaging several diameters apart between scrobe and midcoxa; interspaces microsculptured but shiny. Punctures of mesothoracic venter 2–3 diameters apart in most specimens (less than that in some), but several diameters apart anterad of signum in single female. Episternal sulcus complete or effaced anteriorly. Propodeal dorsum microareolate and variously, unevenly microridged, with short, fine ridges basally; side shiny, with punctures that are several diameters apart, in some specimens with short ridges along metapleural sulcus. Hindcoxal dorsum carinate basally. Sternum I with longitudinal carina in some males.

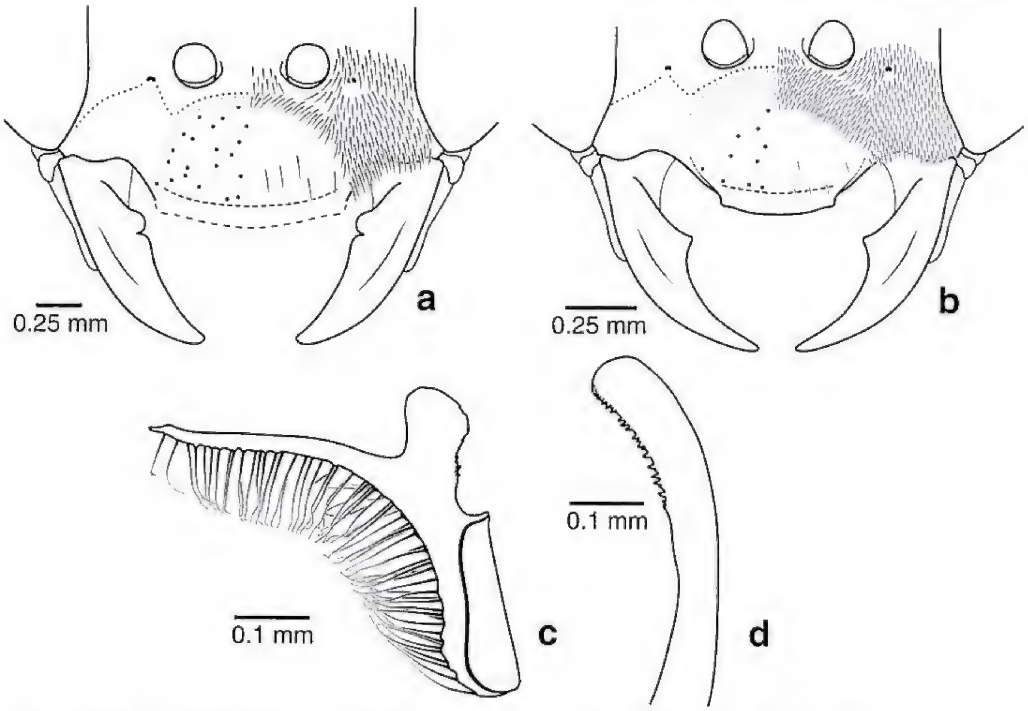


FIGURE 248. *Tachysphex namaqua* Pulawski, sp. nov.: a – female clypeus and mandible (broken line indicates reconstructed clypeal free margin); b – male clypeus and mandible; c – volsella; d – penis valve.

Setae erect on each side of oral fossa next to occipital carina, nearly as long as midocellar diameter; erect and straight on postocellar area, as long as midocellar diameter or slightly longer; scutal setae nearly appressed, except suberect and sinuous anteriorly in males from Aggeneys, about twice length of midocellar diameter; oriented posterad on propodeal dorsum.

Head and thorax black, mandible yellowish red (except apically). Frontal setae silvery in female, silvery or with golden tinge in most males but golden in those from Aggeneys. Wing membrane almost hyaline; costal vein of forewing light brown, subcostal vein dark brown. Femora all or partly red, tibiae and tarsi red. Gastral segments I–III red in most specimens, remainder black (female sterna II and III black), but gaster all black except terga I and II reddish posteromesally in male from Rietbron. Terga nonfasciate in female, in male terga I–III each with ill-defined apical silvery fascia.

♀.— Clypeus (Fig. 248a): bevel markedly longer than basomedian area, its most elevated point next to frontoclypeal suture; lip free margin arcuate (worn out anteriorly in single female examined, may by incised or not incised laterally). Width of postocellar area 0.9 × length. Dorsal length of flagellomere I 2.6 × apical width. Venters of trochanters I–III unsculptured except for a few, large punctures. Fore-, mid-, and hindfemoral venters and midfemoral posteroventral surface impunctate except for a few, sparse punctures. Dorsal foretibial surface with two or three spines; outer surface with three spines, broadly asetose; mid- and hindtibial dorsa broadly asetose except for a few spines. Forebasitarsus with eight or nine rake spines. Length of midtarsomere III equal to apical width. Tergum V with minute punctures that are several diameters apart, apical depression impunctate, asetose. Pygidial plate with punctures that are many diameters apart at center and mostly 2–3 diameters apart near margin. Length 11.1 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 248b): bevel markedly longer than basomedian area, delimited anterolaterally by obtuse carina that emerges from lip corner; lip free margin arcuate, with well-defined corner; distance between corners 0.6–0.8 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width; length of flagellomere VIII 2.0 × width. Forefemoral notch with microscopic, erect setae, but asetose in specimen from Rietbron. Outer margin of forebasitarsus without preapical spines (one specimen from Aggeneys), with one such spine next to apical one in two other males from Aggeneys, two spines in male from Rietbron, and three spines in other males; outer apical spine of foretarsomere II shorter than tarsomere III. Sterna IV–VI with well-defined punctures and at least some erect setae (longest setae about equal to midocellar diameter). Sternum VIII deeply emarginate apically. Length 7.7–9.6 mm. Volsella and penis valve: Figs. 248c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 249).— South Africa.

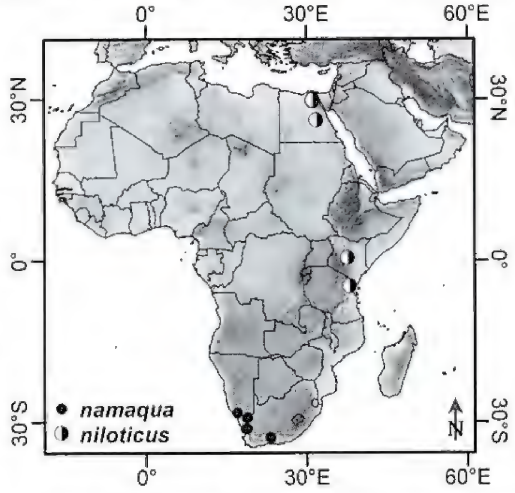


FIGURE 249. Collecting localities of *Tachysphex namaqua* and *niloticus*.

RECORDS.— HOLOTYPE: ♀, **SOUTH AFRICA**: **Western Cape Province**: Knersvlakte, October 1939 [South African] Mus. Staff (SAM). PARATYPES: **SOUTH AFRICA**: **Eastern Cape Province**: Rietbron [spelled Reitbron on the label], 13 Jan 1965, H. Empey (1 ♂, AMG). **Northern Cape Province**: Aggeneys [spelled Aggenys on the label], Oct 1939 [South African] Mus. Staff (1 ♂; 2 ♂, SAM); Richtersveld National Park at 28°18.9′S 16°58.3′E, 12–14 Sept 2001, WJP (2 ♂). **Western Cape Province**: Knersvlakte 48 km N Vanrhynsdorp at 31°14′S 18°32′E, 20 Sept 1996, F.W., S.K., and R. Gess (2 ♂, AMG)

Tachysphex niloticus Pulawski

Figures 249, 250.

Tachysphex niloticus Pulawski, 1964:90, ♀, ♂. Holotype: ♂, Egypt: Abu Rawash near Cairo (CAS), examined.— Pulawski, 1971:348 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:275 (listed).

RECOGNITION.— *Tachysphex niloticus* is similar to *geniculatus*, *horus*, *inextricabilis*, and *luxuriosus* with which it shares the shape of the labrum, postocellar area, female mandible and clypeus, setae short on the postocellar area and appressed on tergum I, and nonemarginate male forefemora (see p. 307 for details). As in *geniculatus* and *horus*, the propodeal side is glabrous along the metapleural sulcus, the scutal hindcorner is not prominent, and the setae of the postocellar area are erect in the male.

The female of *niloticus* differs from *geniculatus* in having the setae appressed on the postocellar impression and postocellar area (rather than erect), and completely concealing the integument of most of the scutum and of mesopleuron (at least in fresh specimens). Also, the gaster of *niloticus* is red at least basally, whereas it is all black in many *geniculatus*. Unlike *horus*, the setae of *niloticus* do not conceal the integument of the forecoxa and hindfemoral outer surface.

The male of *niloticus* differs from *geniculatus* and *horus* in having a long, narrow dorsal volsellar process (Fig. 250), rather than low, rounded (Figs. 161e and 187), and the outer apical spine of

foretarsomere II as long as tarsomeres III and IV combined (spine in *geniculatus* and *horus* at least slightly shorter than tarsomeres III and IV combined). The setae totally or largely conceal the vestiture between the midocellus and the antennal socket, at least in the ventral half, whereas in most *geniculatus* the integument is visible from most angles. Also, the mesothoracic venter of *niloticus* is sparsely punctate anterad of each coxa. In many (but not all) *geniculatus* and *horus*, the mesothoracic venter is densely punctate (punctures about one diameter apart).

Description.— Labrum convex, conspicuously protruding beyond clypeal free margin. Galea with only a few, sparse punctures, as long as 0.8 of scape in female, 0.9 in male. Scutal punctures well defined, about one diameter apart except some discal punctures 2–3 diameters apart in female from Abydos, Egypt. Mesopleuron coriaceous, dull. Mesothoracic venter with large, sparsely punctate area anterad of each midcoxa (punctures many diameters apart except about one diameter apart anteriorly and adjacent to midline). Propodeal dorsum conspicuously microsculptured, dull, with ill-defined, longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area in female but erect in male (setal length about equal to midocellar diameter); erect on each side of oral fossa next to occipital carina, about 0.3 × basal mandibular width; appressed on scutum; in fresh females fully concealing integument on frons, scutum, and mesopleuron but not on forecoxa nor on hindfemoral outer surface; suberect on mesopleuron in male; oriented anterad on propodeal dorsum in most specimens, but oriented posterad in some females; propodeal side asetose next to metapleural sulcus. Sternum I all or largely glabrous in most specimens, setose in some males.

Head and thorax black except mandible reddish mesally and clypeal lip reddish in some females. Frontal setae silvery in both sexes. Wing membrane hyaline; costal and subcostal veins of forewing yellowish. Femora black (except apically), tibiae red in female, in male varying from largely black (red basally and apically) to largely red (hindtibia all red in some specimens); tarsi red. Gaster in female all red or segments III–VI black; in male gaster all black or segments I and II red. Terga I–IV silvery fasciate apically, also male tergum V laterally.

♀.— Mandible: cleft unusually broad, widely open (as in Fig. 161c). Clypeus (as in Fig. 161c): bevel shorter than basomedian area, delimited anterolaterally by inconspicuous carina that emerges from lip corner; lip somewhat ill defined, minimally arcuate, at most minimally emarginate mesally, roundly emarginate laterally. Width of postocellar area 2.1–2.2 × length. Dorsal length of flagellomere I 2.4–2.5 × apical width. Midtrochanteral venter unsculptured except for a few, sparse punctures. Forefemoral base, on anteroventral surface, with a few large punctures that are many diameters apart, interspaces impunctate in Egyptian specimens, with minute punctures in those from Kenya and Tanzania. Dorsal foretibial surface with two or three spines; outer surface with two or three spines. Forebasitarsus with 6–8 rake spines in Egyptian females, 10 or 11 spines in those from Kenya and Tanzania. Apical tarsomeres with preapical ventral seta. Apical depression of tergum V unsculptured, asetose. Pygidial plate with fine punctures that average many diameters apart; interspaces unsculptured to aciculate; lateral carina obtuse but well defined. Length 8.3–9.9 mm, 12.0 mm in female from Tanzania.

♂.— Mandible: trimmal carina obtusely angulate, without tooth or cleft. Clypeus (as in Fig. 161d): bevel about as long as basomedian area; lip free margin slightly arcuate, almost straight, with obtuse corner; distance between corners 1.2–1.4 × distance between corner and orbit. Width of postocellar area 2.2–2.4 × length. Dorsal length of flagellomere I 1.7–2.0 × apical width. Forefemur not emarginate. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II about as long as tarsomeres III and IV combined. Sternum VIII with small expansion at center of apical emargination. Length 6.5–7.5 mm. Volsella and penis valve: Figs. 250.

COLLECTING PERIOD.— 3–5 March (Abydos), 3–25 April (Ghiza area), 2–8 December (Archer's Post), 29–31 December (Mkomazi).

GEOGRAPHIC DISTRIBUTION (Fig. 249).— Egypt, Kenya, Tanzania.

RECORDS.— **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash (1 ♀, 3 ♂), Ghiza (1 ♂), Saqqara (1 ♀, 2 ♂). **Sawhaj**: Abydos (1 ♀, 2 ♂). **KENYA**: **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♀). **TANZANIA**: **Tanga Region**: 2 km NE Mkomazi (1 ♀).

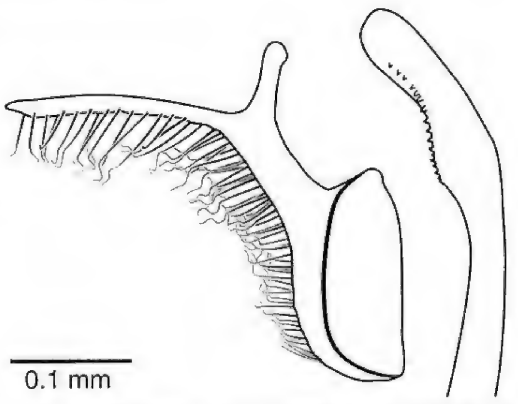


FIGURE 250. *Tachysphex niloticus* Pulawski: volsella and penis valve.

Tachysphex nitidior de Beaumont

Figures 251–253.

Tachysphex nitidus variété C de Beaumont, 1936a:207 (in revision of French *Tachysphex*), 1936c:8 (specimen in A. Costa collection). Synonymized with *Tachysphex nitidior* by de Beaumont, 1953b:15.

Tachysphex nitidior de Beaumont, 1940:175, ♀, ♂. Syntypes: Egypt: Ezbet el Nakhl near Cairo (originally A. Alfieri collection, now Entomological Society of Egypt) and Wadi Hof near Cairo (originally A. Mochi coll., now ?, not in MSNT), not examined.— Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:199 (in revision of Egyptian *Tachysphex*), 1950b:20 (Egypt), 1954a:59 (Italy), 1954b:91 (Italy); Grandi, 1954:239 (Italy); de Beaumont, 1955:184 (Morocco); Ceballos, 1956:377 (listed from Spain); Nouvel and Ribaut, 1958:13 (France); Pulawski, 1958:181 (Bulgaria); de Beaumont, 1959:28 (Italy); Suárez, 1959:58 (Spain); de Beaumont, 1960a:18 (Greece), 1960b:239 (Libya), 1961a:50 (Greece), 1962:26 (Spain); Ceballos, 1964:90 (in supplement to catalog of Spanish Sphecidae); de Beaumont, 1964:77 (Switzerland), 1965:50 (Greece); Balthasar, Hrubant, and Hrubant, 1967:171 (Bulgaria); Heinrich, 1967:75 (Germany, as *nitidor*); Pulawski, 1967:405 (Turkey), 1971:167 (in revision of Palearctic *Tachysphex*); Tsuneki, 1972:393 (Mongolia); de Beaumont, Bytinski-Salz, and Pulawski, 1973:8 (Israel); Erlandsson, 1974:72 (Italy, Malta); Bohart and Menke, 1976:275 (listed); Kazenas, 1978:122, 131 (in key to Sphecidae of Kazakhstan and Central Asia); Pulawski, 1978:218, 221 (in key to Sphecidae of European USSR); Pagliano, 1980:127 (Italy); Gayubo, 1984a:85 (Spain), 1984b:365 (Portugal), 1986c:33 (Spain); Gayubo and Sanza, 1986:46 (Spain); Islamov, 1986:526 (Uzbekistan); Gayubo, 1987:113 (Spain); Gayubo and Mingo, 1988:80 (Spain); Gayubo, Asís, and Tormos, 1990:18 (Spain); Pagliano, 1990:104 (in catalog of Italian Sphecidae); Schembri, 1991:180 (Malta); Torregrosa, Gayubo, Tormos, and Asís, 1993:18 (Spain); Gayubo and Borsato, 1994:208 (Italy); Tormos, Asís, and Gayubo, 1994:188, 205 (Spain); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Voblenko, Gorobchishin, and Nesterov, 1996:14 (Ukraine); Schmidt and Schmid-Egger, 1997:29 (records from Germany are questionable); Gayubo, García, Torres, and González, 1999:90 (Spain); Ljubomirov, 1999b:50 (Bulgaria); Blösch, 2000:229 (in Sphecid Fauna of Germany); Gayubo, González, and Torres, 2000:185 (Spain); Ivanov and Ljubomirov, 2001:212 (Bulgaria); Kazenas, 2001:29 (in checklist of Sphecidae of Kazakhstan and Central Asia); Kazenas and Esenbekova, 2001:134 (Kazakhstan); Schmidt and Bitsch *in* Bitsch et al., 2001:259 (in Sphecid Fauna of Western Europe); Kazenas 2002:72 (Kazakhstan); Gayubo, Özbek, and Yildirim, 2003:89 (Turkey); Generani, Pagliano, Scaramozzino, and Strumia, 2003:65 (Italy); Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004:108 (Spain); Cruz-Sánchez et al., 2005:220 (Spain).

TYPE MATERIAL.— De Beaumont (1947a:200) designated a female from Gibraltar as the holotype of *nitidior* and a male of the same origin as the allotype. This action was illegal because the specimens were not included in his original description of 1940.

RECOGNITION.— *Tachysphex nitidior*, an all black species occurring north of the equator, has well-defined mesopleural punctures and shiny interspaces, setae erect on the postocellar area, near-

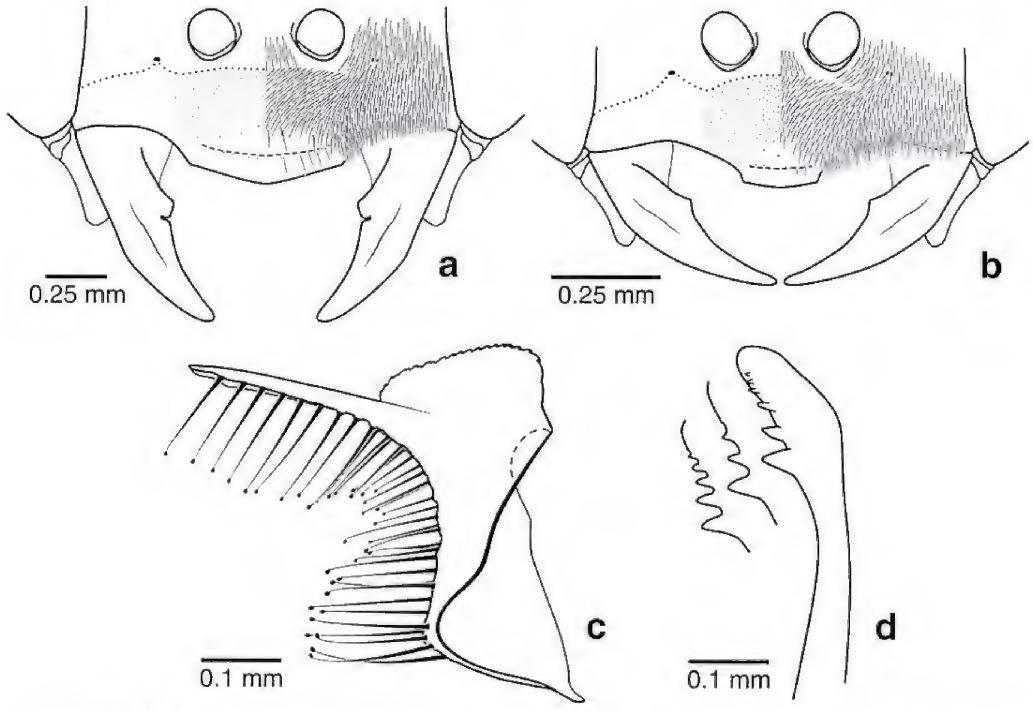


FIGURE 251. *Tachysphex nitidior* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve with outlines showing individual variation.

ly so anteriorly on the scutum, suberect on midfemoral venter (about as long as midocellar diameter), and inclined obliquely anterad on the propodeal dorsum. Additionally, it has a flat, not emarginate labrum and unspecialized tarsi (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins).

The female of *nitidior* closely resembles *tarsinus* and like that species has the clypeal bevel convex but shorter than the basomedian area and the lip free margin arcuate, not incised laterally. In *nitidior*, however, punctures of sternum III and IV are fine but well defined, and they reach the base of the apical depression (in *tarsinus*, these punctures are ill defined and do not reach the apical depression). *Tachysphex nitidior* is also similar to *lindbergi* from Cape Verde Islands and Madeira. It differs from the latter in having somewhat coarser scutal, mesopleural, and sternal punctures, a character that requires comparison with positively identified specimens. The geographic distribution, however, enables recognition, as *nitidior* does not extend into the Eastern Atlantic islands. Several Palearctic species that extend into North Africa are also similar, particularly *angustatus* Pulawski. See Pulawski (1971) for their recognition characters.

The male of *nitidior* differs from similar species in having a relatively large, asetose, and shiny forefemoral notch (Figs. 252a-c), well-defined sternal punctures, and the mandible of most specimens yellowish red mesally. The clypeal lip is narrow in most specimens (corners closer to each other than to respective orbit), but broad in some (corners equidistant from each other and orbit). Additionally, punctures of tergum VII mesally are minute, more than one diameter apart.

DESCRIPTION.— Scutal punctures well defined, on disk either all about one diameter apart or many punctures more than one diameter apart. Mesopleural punctures well defined, large, varying from less than one diameter apart to more than one diameter apart beneath scrobe and anterodorsad

of midcoxa. Propodeal dorsum rugose or irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate.

Setae erect on postocellar area, nearly erect on each side of oral fossa next to occipital carina (setal length 0.4–0.5 × basal mandibular width), suberect on scutum anteriorly, inclined obliquely anterad on propodeal dorsum, suberect on midfemoral venter (longest setae about equal to midocellar diameter).

Head and thorax black, mandible mesally reddish in female, yellowish red in most males but dark red in some. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal vein of forewing light brown, subcostal vein dark brown. Femora, tibiae, and gaster black, tarsal apex brown or reddish. Terga I–III silvery fasciate apically in most specimens, but I–V in single female from Kenya.

♀.— Clypeus (Fig. 251a): bevel shorter than basomedian area (but in some specimens with narrow, impunctate area that extends nearly to frontoclypeal suture); lip free margin arcuate, not incised laterally. Width of postocellar area 1.2–1.6 × length. Dorsal length of flagellomere I 1.9–2.7 × apical width. Dorsal foretibial surface with either a row of fine, suberect bristles or one or two spines; outer surface with one spine near midlength. Forebasitarsus with nine or ten rake spines. Tergum V setose throughout, including apical depression. Pygidial plate microsculptured, dull, with minute punctures that average many diameters apart. Length 7.8–13.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 251b): bevel shorter than basomedian area, slightly concave in some specimens; lip free margin arcuate, with well-defined, somewhat prominent corner; distance between corners 0.5–1.0 × distance between corner and orbit (mostly less than 1.0). Width of postocellar area 1.3–1.7 × length. Dorsal length of flagellomere I 1.1–1.5 × apical width. Forefemoral notch larger than average for the genus, glabrous, with sparse pores (Figs. 252a-c). Outer margin of forebasitarsus without preapical spines or, in some specimens, with 1–3 short spines (one near apex, one or two near base); outer apical spine of foretarsomere II markedly shorter than tarsomere III. Tergum VII mesally with evanescent punctures that are more than one diameter apart. Sternal punctures well defined, relatively large. Length 5.5–9.0 mm. Volsella and penis valve: Figs. 251c, d.

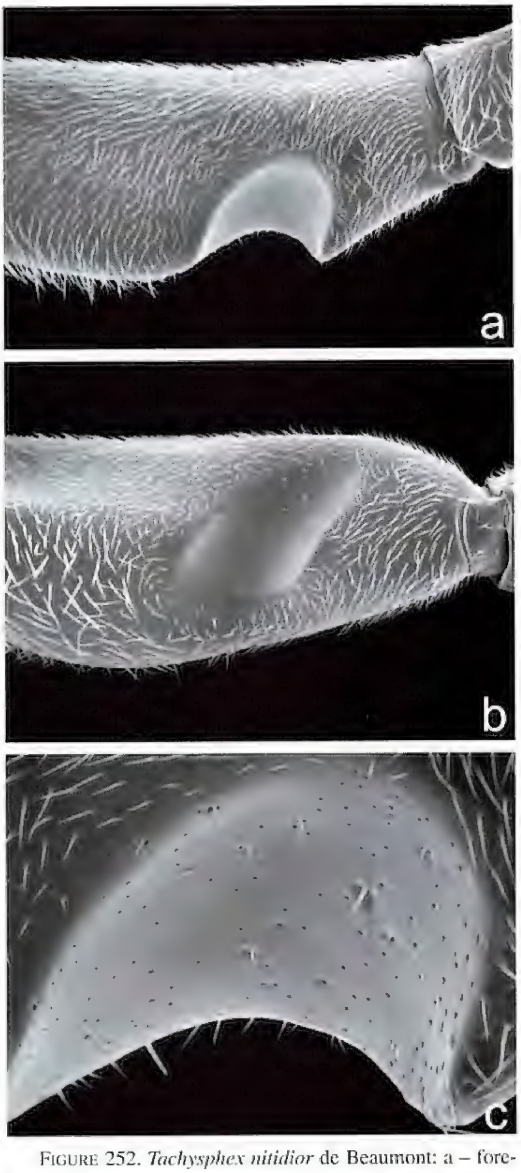


FIGURE 252. *Tachysphex nitidior* de Beaumont: a – forefemoral base in posterior view (×102); b – forefemoral base in ventral view (×102); c – forefemoral notch (×360).

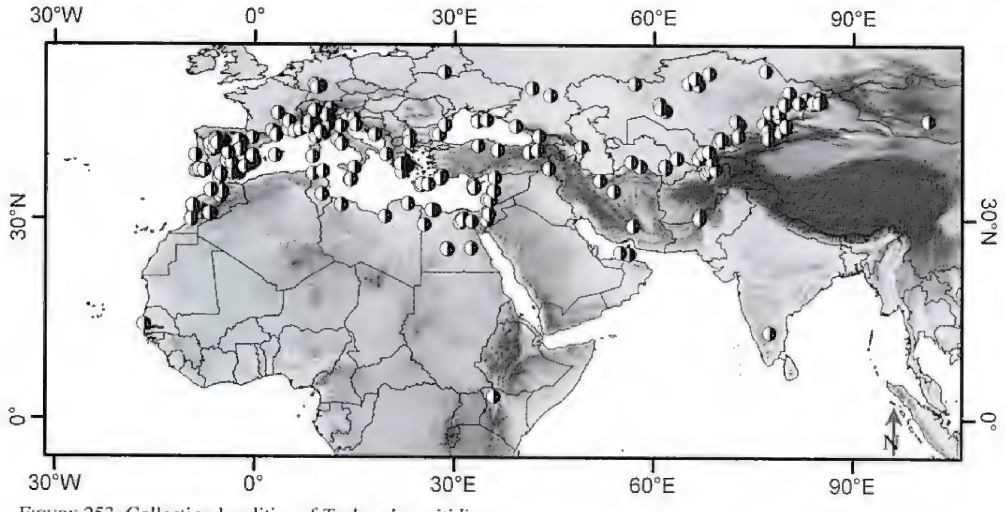


FIGURE 253. Collecting localities of *Tachysphex nitidior*.

GEOGRAPHIC DISTRIBUTION (Fig. 253).— North Africa, south to Senegal and Kenya, United Arab Emirates, Europe north to southern France, Romania, and Ukraine, in Asia east to Kazakhstan, Mongolia, and India. Records from Germany by Heinrich (1967) were questioned by Schmidt and Schmid-Egger (1997) and Ohl et al. (2001).

RECORDS (from Pulawski, 1971, if not indicated otherwise).— **AZERBAIJAN**: Varafta Mts. NW Baku and W Kilyazi at 40°50′N 49°10′E (2 ♀, CSE). **BULGARIA**: Aytos (1 ♀, 2 ♂), Kresna Gorge at 41°48′N 23°10′E (Ivanov and Ljubomirov, 2001), Mt. Vitosha near Sofia (Ljubomirov, 1999), Nessebar, Sandanski, Slanchev Bryag near Sozopol (Balthasar, Hrubant, and Hrubant, 1967). **CROATIA**: Gruz near Dubrovnik, Krk Island: Barka (1 ♀, SCHL), Pula and Vipava in Istria Peninsula, Senj (1 ♀), Uglian Island: Preko. **CYPRUS**: Akrotiri, Kalohorio (8 ♀, 1 ♂), Kolossi (1 ♀, 2 ♂), Pera Pedi (1 ♂), Yermasoyia River (1 ♀). **EGYPT**: **Al Fayyum**: Kom Osheim (8 ♂; 2 ♂, MSNT). **Al Qahirah** (= Cairo): Cairo (1 ♀), Ezbet el Nakhl (de Beaumont, 1940), Wadi Hof (de Beaumont, 1940). **Al-Uqsur** (= Luxor): 3 km W Luxor (4 ♂). **Al-Wadi al-Jadid**: Dakhla oasis: Ewina (3 ♂, ZMAN), Rashda (1 ♂, ZMAN); Siwa oasis (de Beaumont, 1950): Siwa, Zegawa. **Matruh**: 20 km (1 ♂), 25–30 km (1 ♂), and 64 km (2 ♂) W Marsa Matruh. **Sina** (= Sinai): Wadi Sudr 50 km SE Suez (1 ♀, 1 ♂). **FRANCE**: **Ardèche**: Privas, Saint-Martin-le-Supérieur. **Aude**: Leucate (3 ♂). **Bouches-du-Rhône**: Marseille, Port de Bouc. **Corse**: Corte (1 ♂). **Drôme**: Bourdeaux, Dieulefit. **Puy-de-Dôme**: Orléat (Bitsch et al., 2001). **Pyrénées-Orientales**: Banyuls-sur-Mer (1 ♀, 1 ♂). **Var**: Montauroux, Toulon, Valescure, a suburb of Fréjus (1 ♂). Several other Départements indicated on map 103 in Bitsch et al., 2001. **GEORGIA**: Sochi. **GREECE**: **Aegean Islands**: Rhodes (de Beaumont, 1960a): Kremasti, Ixia, also Vatio at 36°03′N 27°54′E (1 ♀, 1 ♂, MSNT). **Ionian Islands**: Corfu (de Beaumont, 1965). **Kriti** (= Crete): Ayia Varvara and Gortyn (de Beaumont, 1961a), Heraklion (de Beaumont, 1965), Knossos (2 ♀), Sitia (de Beaumont, 1965). **Pelopónnisos** (de Beaumont, 1965): Corinth, Kalamata. **Sterea Ellás** (de Beaumont, 1965): Gardhiki at 38°50′N 21°58′E, Lamia, Lidhorikion at 38°17′N 21°58′E. **INDIA**: **Karnataka**: Bangalore (1 ♂). **IRAN**: Ab Ali (1 ♀), Khunikaka in Kerman Province, Van in Elburz Mountains 50 km N Ab Ali (1 ♀). **ISRAEL**: Akko N Haifa, En Zin in Arava Valley (2 ♂, CSE), 135 km N Elat Iddan at 30°47′N 35°17′E (1 ♀, CSE), En Aqev near Sede Boker at 30°50.01′N 34°48.64′E (1 ♀, CSE), Mazad Aqrabbim 45 km SE Beersheba (5 ♂, CSE), Qetura Kibutz in Arava Valley (1 ♂, UCD), Shizaf Nature Reserve in Arava Valley (1 ♀, CSE), Tiberias (de Beaumont, Bytinski-Salz, and Pulawski, 1973). **ITALY**: **Emilia-Romagna** (de Beaumont, 1954; Grandi, 1954): Bologna, Borgo Campanne (Bologna), Gaggio Montano (Bologna), Montetortore (Bologna), Rimini, Ronzano (Bologna). **Lazio** (de Beaumont, 1959): Capo Circeo (Pagliano, 1990), Roma, San Felice Circeo. **Liguria**: Casella, Chiavari (Pagliano, 1990), Genova, Oneglia (1 ♀), Varezze. **Marche**: Pesaro. **Piemonte**: Langhe: San Benedetto Belbo (Pagliano, 1980). **Sardegna**: Domusnovas (Pagliano, 1990). **Sicilia**:

Monte Etna (de Beaumont, 1959). **Toscana**: Isola di Capraia (Generani, Pagliano, Scaramozzino, and Strumia, 2003); Isola d'Elba, Taviano (Pistoia). **Trentino-Alto Adige**: Bolzano. **Veneto**: Montorio Veronese (Gayubo and Borsato, 1994), Torri del Benaco (Pagliano, 1990). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: 5 km NE Aktöbe (K), Babatay near Uil (K, P), Bolshiye Barsuki sands near Chelkar (K, P). **Almaty**: Almatinskiy Nature Reserve (Kazenas and Esenbekova, 2001), Almaty (K), 9 km S Almaty (K), 25 km E Chingildy = 120 km NE Almaty (K), 10 km NW Chundzha (K), Kapchagay (K), 8 km S and 40 km E Kapchagay (K), Kaskelen River 60 km N Almaty (1 ♀, 2 ♂), 5 km SW Kazakahstan village (K), 40 km SE Kopberlik (K), 10 km E Kzyl-Agach = 60 km NNE Taldy-Kurgan (K), Lepsy (K), 11 km S Panfilov, now Zharkent (K), 7–8 km S Talgar (K). **Aqmola**: 12 km NE Atbasar (K), Bayzhanzhal (P), 2 km N Derzhavinsk at about 51.5°N 66°E (K), Kokshetau at Terisakkan River (1 ♀), Lake Ilektykol' on left shore of Terisakkan River (P), 6 km NE Lake Ilektykol' (1 ♀, 1 ♂), 12 km S Priozernoe (K). **East Kazakhstan**: between Aksuat and Zaisan (K), 5 km S and 33 km SSW Ayaguz (K), 4 km W Bazarka (K), 20 km NW Chernyaevka = 60 km NW Zaysan (K), 40 km S Kyzyl-Kesik = 120 km E Ayaguz (K), 5 km SW and 20–25 km NW Tansyk (K), 3 km E Ul'ken-Karatal at about 47.7°N 85°E (K), 15 km ENE Zaisan (K). **Pavlodar**. Pavlodar (K). **Qaraghandy**: 5 km W southern shore of Lake Tenghiz (P), shore of Taly-Manak S Zhana-Arka (P), Zhana-Arka = Atasuskiy (P). **Qostanay**: 25 km NE Amangel'dy (K), 10–20 km SW Arkalyk at about 50°N 67°E (K), Zhalanash (K). **Qyzylorda**: Chokusu railroad station 30 km NW Saksaul'skiy (K), Dzhulek = Chiili (P), 10 km NNW Kamyshlybash (K). **South Kazakhstan**: 9–18 km S Kaskasu village 70 km E Chimkent (K), 10 km SSE Kaskasu (K), 5 km E Novostroyevka near Lengher at about 42°N 70°E (K), 15 km S Pervomaiskoye = 70 km SE Chimkent (K). **West Kazakhstan**: confluence of Chit-Yrghyz and Yrghyz 100 km NNE Chelkar (P). **Zhambyl**: 4 km SE and 50–90 km NW Furmanovka (K), 38 km S Kamenka (K). **KENYA**: **Rift Valley Province**: Eliye Springs on W shore of Lake Turkana (1 ♀). **KYRGHYZSTAN**: 10 km E Kadzhi–Saj at 42°10′33″N 77°18′55″E (1 ♀, 1 ♂, AMNH). **LEBANON**: Becharré (1 ♂), Kadisha (1 ♂). **LIBYA**: **Cyrenaica**: Brèga, Tmimi (de Beaumont, 1960b). **Tripolitania**: Garian Hills. **MALTA**: Bahria (Schembri, 1991), St. Julians, Wied is-Sewda (Schembri, 1991). **MONGOLIA**: **South Gobi Aymag**: Noyon-nuur 34 km NE border post Ovot-Huural (Tsuneki, 1972). **MOROCCO** (de Beaumont, 1955, or as indicated): Ait Saoun (1 ♀, 1 ♂), Asni, Azrou in Moyen Atlas (1 ♂), Fès (1 ♂), Ijoukak, Kenitra (1 ♂; 1 ♀, SCHL), Kenitra: Mehdia (1 ♀), Marrakech: Oued Tensift (2 ♀, 2 ♂), 10 km SE Ouarzazate (1 ♂, CSE), Oued Massa 40 km S Agadir (1 ♂, CSE), Tiznit: Oued Massa. **PAKISTAN**: **Baluchistan**: Hazarganji Chiltan National Park 20 km SW Quetta (1 ♀), Quetta (1 ♀, 4 ♂, BMNH; 1 ♂, USNM), Peshin (1 ♀, BMNH). **PORTUGAL**: Carrapateira 20 km N Sagres at 37°12′N 8°55′W (2 ♀, CSE), Evora, and the following localities in El Algarve (Gayubo, 1984c): Benafim, Marmelete, Quarteira, Salir, São Marcos da Serra, Umbrías de Camacho. **ROMANIA**: Agigea. **RUSSIA**: **Krasnodar Kray**: Lazarevskoye 60 km N Sochi (1 ♀, 1 ♂). **Rostov Oblast'**: Vëshenskaya village area at 49°37′N 41°45′E (Shkuratov, 2000). **Volgograd Oblast'**: Sarepta = Krasnoarmeysk. **SENEGAL**: Ndangane 45 air km SE Mbour (1 ♂, FB). **SPAIN**: **Albacete** (Tormos, Asís, and Gayubo, 1994): Bonete, Puente de Torres. **Alicante** (Torregrosa, Gayubo, Tormos, and Asís, 1993): Agost, Albatera, Alicante, Callosa d'en Sarria, Elche, Monnegre, Muchamiel, San Vicente del Raspeig. **Almería**: Almería, Laujar (3 ♂). **Ávila**: Navalperal (Gayubo and Mingo, 1988). **Burgos** (Gayubo and Sanza, 1986): Doña Santos, Fuentelcésped, Fuentespina, La Aguilera. **Cáceres**: Horcajo (1 ♂). **Ciudad Real** (Gayubo, 1987): Corral de Calatrava, Retamar. **Gibraltar**: Gibraltar (de Beaumont, 1947a). **Granada**: La Zubia (de Beaumont, 1962), Sierra Lujar. **Guadalajara**: Albalate (1 ♀, SCHL). **Huesca**: Huesca. **Jaen**: Las Correderas. **Madrid** (Gayubo and Mingo, 1988): Alcalá de Henares, El Escorial, Monte de el Pardo (Gayubo, Nieves-Aldrey, González, Tormos, Rey del Castillo, and Asís, 2004:108), Villaverde. **Málaga**: Ronda. **Mallorca**: no specific locality. **Murcia**: Totana-Aledo. **Salamanca**: La Alberca (Gayubo, 1984a), Fuenteguinaldo (Gayubo, 1984a), Las Arribes del Duero (Gayubo, González, and Torres, 2000), Macotera (Gayubo, 1984a), Salamanca, San Martín del Castañar (Cruz-Sánchez et al., 2005), Sequeros (de Beaumont, 1962), Tamames (Gayubo, 1984a). **Soria** (Gayubo, García, Torres, and González, 1999): Cuevad de Ayllón, Deza, Fuentecambrón, Soria (Pulawski, 1971). **Teruel**: Albalate (1 ♀, SCHL). **Toledo**: Toledo. **Valencia:** Valencia (Gayubo and Mingo, 1988). **Valladolid**: Valladolid (Gayubo, Asís, and Tormos, 1990). **Zamora** (Gayubo, 1986a): Brime de Urz, Olmillos de Castro, Peleas de Arriba. **SWITZERLAND**: south of the Alps (de Beaumont, 1964). **TAJIKISTAN**: Ayvaj, Kabadyan, Kondara 35 km N Dushanbe (1 ♀, 1 ♂), Kurgan-Tyube, Parkhar, Ruydasht 40 km N Dushanbe. **TUNISIA**: Ain Draham 1 km S Kroumirie (1 ♀, CSE), 24 km S Gabès at 33°42′N 10°00′E (2 ♂, CSE), Ghar

el Melh 35 km S Bizerte (1 ♂, CSE). **TURKEY** (Gayubo, Özbek, and Yildirim, 2003, or as indicated); **Çankiri**: Ilgaz (Pulawski, 1967). **Erzurum**: University campus. **Hakkâri**: Yüksekova (4 ♂, CSE). **Hatay**: Antakya (6 ♂). **Kars**: Sankamiş. **Tokat**: Tokat. **TURKMENISTAN**: Charjow (1 ♂), Firuza 40 km W Askhabad, Kara-Kala, Mary, 40 km N Mary (1 ♀, 1 ♂), Repetek (1 ♀). **UKRAINE**: Polesye area (Voblenko, Gorobchishin, and Nesterov, 1996), Sevastopol', Sudak. **UNITED ARAB EMIRATES**: Hatta (1 ♂; 1 ♀, 1 ♂, KMG), Jabal Ali (1 ♂, KMG). **UZBEKISTAN**: Aman-Kutan 35 km SW Samarkand, Kitab, Kuropatkino 50 km SW Samarkand, Tashkent, Tashkent Oblast' (Islamov, 1987): village Khumsan in Karshantau Range and village Sidjan in Ugamskiy Range.

Tachysphex nitidissimus de Beaumont

Figures 254, 255.

As *Tachysphex* No. 11: de Beaumont, 1940:176 (in revision of Egyptian *Tachysphex*), corrected to *Tachysphex nitidissimus* by Pulawski, 1971:154.

As *Tachysphex* No. 14: de Beaumont, 1940:177 (in revision of Egyptian *Tachysphex*), corrected to *Tachysphex nitidissimus* by Pulawski, 1971:154.

Tachysphex nitidissimus de Beaumont, 1952a:192, ♀, ♂. Holotype: ♂, Algeria: Hoggar: Idjef Mélène near Hirhafok (LAUSANNE), examined before 1971.— de Beaumont, 1958:62 (Algeria: Tassili des Ajjer); Pulawski, 1964:95 (Egypt); de Beaumont, 1965:49 (Greece, diagnostic characters); Pulawski, 1967:405 (Turkey), 1971:154 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:8 (Israel); Bohart and Menke, 1976:275 (listed); Kazenas, 1978b:121, 131 (in key to Sphecidae of Kazakhstan and Central Asia); Guichard, 1980:228 (Oman), 1991:339 (Jordan); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:30 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002:72 (Kazakhstan); Gayubo, Özbek, and Yildirim, 2003:89 (Turkey).

Tachysphex consocius mookonis Tsuneki, 1972e:392, ♀. Holotype: ♀, Mongolia: Hovd Aymag: 45 km NNE Somon Bulgan (TMB), examined. Synonymized with *Tachysphex nitidissimus* by Pulawski *in* Krombein and Pulawski, 1994:28.— Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex nitidissimus*, an all black species that occurs north of the equator, has the scutal and mesopleural punctures well defined and interspaces shiny, and the setae erect on the postocellar area and distal half of the midfemoral venter (midfemoral setae no longer than one midocellar diameter). Other characteristics include a flat, not emarginate labrum, presence of only three silvery tergal fasciae (exceptionally only two), and unspecialized tarsi (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins). The clypeal bevel is convex in the female.

Most females of *nitidissimus* differ from similar species in having a narrow postocellar area (width 0.9–1.3 × length) and setae of postocellar area short (about one midocellar diameter long). The setae, however, are up to about 1.5 midocellar diameter in Egyptian specimens. In some populations (including those from Egypt), the punctures are several to many diameters apart on the postocellar area and scutal disk, thus markedly sparser than in similar species.

The male of *nitidissimus* differs from most of its congeners in having short flagellomeres I–III (venter of flagellomere I slightly shorter than apical width) that contrast with a markedly longer flagellomere IV (length of flagellomere III about 0.6–0.7 of IV, Fig. 254c). Flagellomeres are similar but somewhat longer in some *nitidus* and in *tarsinus*, and almost identical in some *fugax* (e.g., in specimens from Balkan Peninsula and Israel). Unlike the latter two species the clypeal lip of *nitidissimus* has no corner (Fig. 254b).

Description.— Scutal and mesopleural punctures well defined; interspaces shiny, unsculptured or nearly so; scutal punctures markedly varying in density (see Variation below), mesopleural punctures at center mostly about one diameter apart, about two diameters in some specimens. Punctures of mesothoracic venter mostly about one diameter apart, but many diameters apart in

some specimens (e.g., those from mainland Egypt and Sinai Peninsula). Propodeal dorsum rugose or irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area and on each side of oral fossa next to occipital carina (setal length mostly about 1.0 × midocellar diameter, but up to about 1.5 × midocellar diameter in Egyptian specimens), suberect on scutum anteriorly, inclined anterolaterad on propodeal dorsum, and nearly erect in distal half of midfemoral venter (no longer than midocellar diameter).

Head, thorax, gaster, and legs black, mandible reddish basally, tarsal apex brown or reddish. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal vein of forewing light brown, subcostal vein dark brown. Terga I–III silvery fasciate apically (I and II in single female from Morocco).

♀.— Clypeus (Fig. 254a): bevel longer than basomedian area; lip free margin arcuate or min-

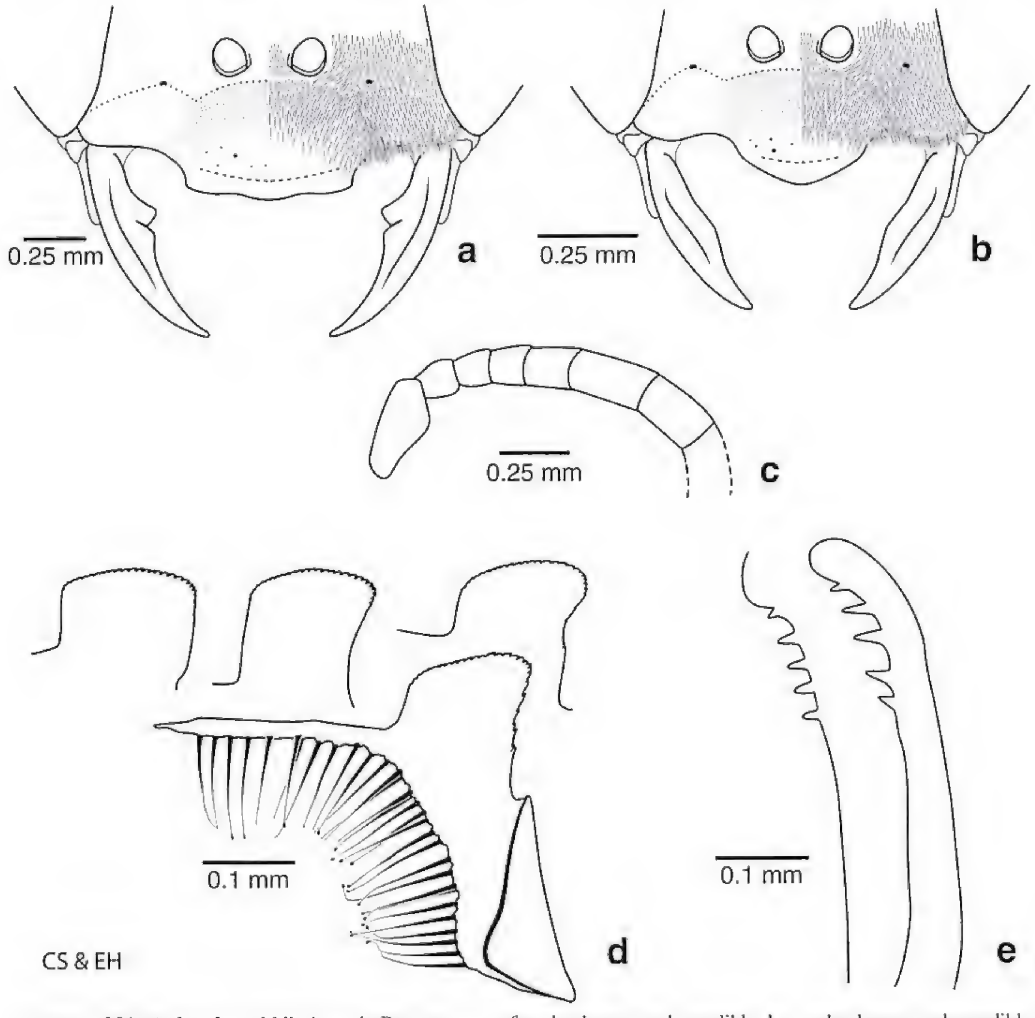


FIGURE 254. *Tachysphex nitidissimus* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – base of male antenna; d – volsella with outlines showing individual variation; e – penis valve with outline showing individual variation.

imally, obtusely expanded mesally, not incised laterally. Width of postocellar area 0.9–1.3 × length. Dorsal length of flagellomere I 2.0–2.5 × apical width. Dorsal foretibial surface with one or two fine spines; outer surface with one or two spines. Forebasitarsus with 5–8 rake spines. Midtrochanteral venter varying from minutely punctate to impunctate. Apical depression of tergum V impunctate, glabrous. Pygidial plate: punctures averaging many diameters apart, interspaces unsculptured except microsculptured basally. Length 5.1–7.8 mm.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 254b): bevel shorter than basomedian area; lip free margin arcuate to obtusely pointed, without corner, forming single curved line with that of lateral section (but bevel, at each lateral end, with minuscule tubercle that is close to clypeal margin); tubercles about equidistant from each other and adjacent orbit. Width of postocellar area 1.3–1.6 × length. Dorsal length of flagellomere I 0.8–1.1 × apical width, equal to about 0.8 of II; ventral length slightly smaller than apical width. Length of flagellomere III about 0.6–0.7 of IV (Fig. 254c). Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere's width. Length 4.0–5.2 mm. Volsella and penis valve: Figs. 254d, e.

Variation.— In many specimens, the postocellar area and scutum are densely punctate (punctures about one diameter apart), but punctures are several to many diameters apart in specimens from the Hoggar and Tassili des Ajjer mountains in Algeria, Lower Egypt, Sinai Peninsula, Arabian Peninsula, some from Israel, and in many specimens from Kazakhstan, Uzbekistan, and Tajikistan.

Geographic distribution (Fig. 255).— Hoggar and Tassili des Ajjer Mountains in Algeria to Morocco and Lower Egypt, Cyprus, Greece and Bulgaria in the north, east to Oman, Turkmenistan, Uzbekistan, Tajikistan, southern Kazakhstan, and Mongolia.

Records (from Pulawski, 1971, if not indicated otherwise).— **ALGERIA**: Dider and Iherir in Tassili des Ajjer (de Beaumont, 1958), Idjef Mélène near Hirhafok in Hoggar (de Beaumont, 1952a). **BULGARIA**: Aytos (2 ♀), Nessebyr, Sandanski (3 ♀), Slanchev Bryag near Sozopol (1 ♀), Sofia: Knyazhevo (3 ♀), Sozopol (1 ♂). **CYPRUS**: Akrounda (1 ♀), Alassa, Eftagonia (1 ♀), Episcopi, Famagusta (1 ♀), Fasoulla (1 ♀), Herkes, near Kalohorio (4 ♀), Kakomallis Mts. (1 ♀), Limassol (4 ♀, 13 ♂), Moni (1 ♀), Yerasa, Yermasoyia River (2 ♂). **EGYPT**: **Al Qahirah** (= Cairo): Maadi (1 ♀), Wadi Hof. **Sina** (= Sinai): Feiran oasis (2 ♀, 1 ♂). **GREECE** (de Beaumont, 1965): **Aegean Islands**: Mykonos, Rhodes: Kremasti (1 ♀), Tinos. **Ionian Islands**: Corfu (1 ♀). **Kriti** (= Crete): Gortyn, Heraklion, Yiofiro (1 ♀). **Pelopónnisos**: Asini, Kalamata. **Sterea Ellás** (= Central Greece): Loutraki, Mt. Penteli, Nea Kifissia, Nea Penteli (1 ♀),

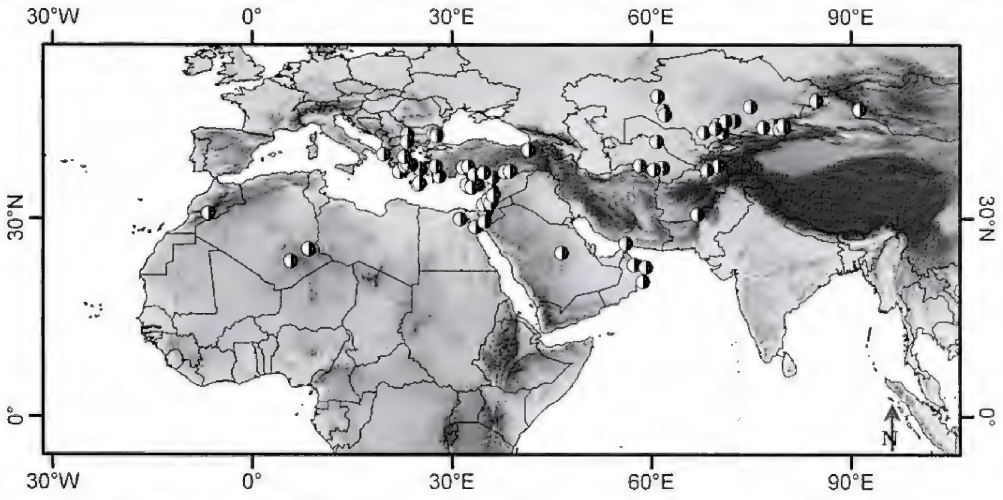


Figure 255. Collecting localities of *Tachysphex nitidissimus*.

Thebes. **Thessalia**: Lehonia 15 km SW Volos. **ISRAEL**: Beersheba (1 ♀), En Zeelim on Dead Sea 5 km N Masada (1 ♀, CSE), Jerusalem, Kurnub (1 ♀), Mesad Aqrabbim 45 km SE Beersheba (1 ♀, CSE), Ramat Gan 5 km E Tel Aviv, Tiberias (1 ♀). **JORDAN**: Aqaba (Guichard, 1991), Djérache (de Beaumont, 1965). **KAZAKHSTAN** (K = Kazenas, 2002): **Aktöbe**: 30 km SW Yrghiz (K). **Almaty**: 15 km E Ayak-Kalkan 150 km NE Almaty on Ili River at about 44°N 78.5′E (K), Borandysu 30 km E Chilik (K), 10 km NW Chundzha (K), Dubun at 43°40′N 80°05′E (K), Kaskelen River 50 km N Almaty (2 ♂), 11 km S Panfilov, now Zharkent (K). **East Kazakhstan**: Rozhkovo at 47°45′N 84°55′E. **Qaraghandy**. Balqash (K) **Qyzylorda**: 3 km NW station Kamyshlybash (1 ♀), 15 km S Kazalinsk (K). **South Kazakhstan**: Otrar at 42°54′N 68°22′E (K). **Zhambyl**: 50–70 km NW Furmanovka (K), Lake Biylikul' (K), Togusken (K), 17–25 km SE Ulanbel' on Chu River (1 ♂), 64 km NW Zhambyl at Lake Biylikul' (K), Zhanatas (K). **LEBANON**: Kadisha. **MONGOLIA**: **Hovd Aymag**: 45 km NNE Somon Bulgan (1 ♀, TMB, holotype of *Tachysphex consocius mookonis*). **MOROCCO**: 8 km N Ait-Saoun on Ouarzazate-Zagora road (1 ♀, KMG). **OMAN**: **Northern Oman**: Masirah Island (1 ♀, KMG), Khasab (1 ♀, KMG); also (Guichard, 1980): Nizwa, Tinaf. **PAKISTAN**: **Baluchistan**: Peshin (2 ♂, BMNH). **SAUDI ARABIA**: Ad Diriyah (1 ♂, KMG). **SYRIA**: Damascus: Barze (2 ♀, 1 ♂), Damascus–Kissoue road. **TAJIKISTAN**: Dashti–Djum E Kulab, Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TURKEY**: **Aydin**: Germencik. **Erzurum**: Tortum (Gayubo, Özbek, and Yildirim, 2003). **Hatay**: Antakya (1 ♀). **Konya**: Beysehir (Pulawski, 1967), Konya. **Mersin**: Mut (2 ♀), Tarsus. **Urfa**: Birecik (1 ♀, 1 ♂), Urfa. **TURKMENISTAN**: Askhabad (1 ♀), Mary, Tedjen (1 ♂). **UZBEKISTAN**: Khiva: Ravat (1 ♂).

Tachysphex nitidus (Spinola)

Figures 256, 257.

[N.B. *Tachysphex nitidus* has been reported more than 130 times in the literature, mostly as locality records from Europe. Only the essential nomenclatural data are provided below. The previous revisionary study is by Pulawski, 1971:149 (as *ibericus*).]

Astata nitida Spinola, 1805:17, sex not indicated. Lectotype: ♀, Italy: Liguria: no specific locality (MSNT), designated by de Beaumont, 1952b:43, examined in 1971.— As *Tachytes nitida*: Spinola, 1808:76 (new combination).— As *Larrada nitida*: F. Smith, 1856:275 (new combination).— As *Larra nitida*: Casolari and Casolari Moreno, 1980:112 (new combination, specimens in M. Spinola collection).— As *Tachysphex nitidus*: Kohl, 1885:372 (new combination, in revision of Larrini).

Tachytes ibericus de Saussure, 1867:68, ♀. Holotype or syntypes: ♀, Gibraltar (NHMW), examined before 1971.— Synonymized with *Tachysphex nitidus* by Kohl, 1885:372.— As *Tachysphex nitidus ibericus*: Pulawski, 1972:817 (new status).

Tachysphex ibericus borealis Pulawski, 1971:148, ♀, ♂. Holotype: ♀, Netherlands: Norwijk a. Z. (RMNH), examined before 1971. Synonymized with *Tachysphex nitidus* by Pulawski, 1972:817.

NOMENCLATURAL HISTORY.— Kohl (1885) thought that *Tachysphex nitidus* (Spinola, 1806), *unicolor* (Panzer, 1806–1809), and *ibericus* (de Saussure, 1867) were all one species, and he synonymized these names. Pulawski (1971) recognized two species that he called *nitidus* (= *unicolor*) and *ibericus*. He subsequently (1972) examined the lectotype of *nitidus* and found that it was actually identical to *ibericus*. As a consequence, *unicolor* became a valid name. This nomenclatural change is unfortunate, as Pulawski's *nitidus* of 1971 is a different species than his *nitidus* of 1972 and than *nitidus* of this paper.

RECOGNITION.— *Tachysphex nitidus* is an all black Palearctic species. It has well-defined scutal and mesopleural punctures with shiny interspaces and erect setae on the postocellar area and the distal half of the midfemoral venter (setal length, on the midfemur, no more than one midocellar diameter). Other characteristics include a flat, nonemarginate labrum and unspecialized tarsi (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins). As in *agnus* and *nitidissimus*, the clypeal bevel is convex in the female, but unlike *agnus* the erect setae are straight or angled at apex, not sinuous.

The female of *nitidus* is similar to *nitidissimus*, but differs in having the setae of the postocel-

lar area longer than midocellar diameter and the scutal punctures no more than two diameters apart (mostly less than one diameter). In most *nitidissimus*, the setae of the postocellar area are about one midocellar diameter long but longer in some desert populations in which the scutal punctures are many diameters apart.

Males of *nitidus* have no lateral corner on the clypeal lip (Figs. 256b), the clypeal free margin thus forming a single, curved line between lip tip and orbit (bevel in some specimens with a lateral tubercle that may superficially look like a lip corner). In addition, the flagellomeres are uniformly sculptured, and sternum VIII is evenly emarginate apically. Two similar species, sympatric with *nitidus* in many areas, are *agnus* and *nitidissimus*. In *nitidus*, however, the setae are straight or angled apically on the postocellar area and the thorax (sinuous in *agnus*, at least anteriorly on the mesopleuron), and flagellomeres I–III are not shortened, III nearly as long as IV (markedly shorter in *nitidissimus*). Also similar are the southern African *hermia*, *longipes*, and *titania*, in which the clypeal bevel is delimited laterally by obtuse carina that emerges from lip and is almost parallel to clypeal free margin. No such carina is present in *nitidus* in which, in addition, the setae are all appressed on the hindfemoral venter (suberect basally in *longipes*) and the galea is shorter than wide in profile and densely punctate apically (in *titania* longer than wide in profile and sparsely punctate apically)

Relationships of *Tachysphex nitidus* and *unicolor*.— These two species are largely sympatric and extremely similar, although most males are easily distinguished: in *nitidus*, the preapical rake spines on the forebasitarsus are present and in most specimens terga I–IV are fasciate; in *unicolor* the preapical rake spines are absent and only terga I–III are fasciate. None of the two characters is constant, however. For example, in some specimens from Central and Northern Europe with four tergal fasciae, the preapical spines may be present on one leg and absent on the other, possibly disappearing on both legs in some cases. In a male from Abu Rawash, Egypt, that I regard as *nitidus*, the foretarsal rake is well defined, but only terga I–III are fasciate. Recognition of females is even more difficult: in *nitidus* the clypeal bevel is shorter than the basomedian area (but narrowly longer mesally in some specimens) and terga I–III or I–IV are fasciate, whereas in *unicolor* the bevel is as long as or longer than the basomedian area, and only terga I–III are fasciate. In practice, distinguishing between the two bevel sizes may be precarious, and species determination for the females with only three tergal fasciae is especially problematic. I thought in 1971 that the mesopleural punctures were evanescent posteriorly in the females of *nitidus*, and well defined in *unicolor* (except for the females from the Canary Islands). Now however, using better optics, I see that punctures are well defined in *nitidus* as well as in most *unicolor*, being evanescent posteriorly only in the Canary Island population of *unicolor*. I conclude that the status of these various populations needs a thorough reevaluation.

Although I reported both *nitidus* and *unicolor* from North Africa (Pulawski, 1971), only *nitidus* is included in this study.

Description.— Scutal punctures well defined, less than one diameter apart in most specimens, but up to about two diameters apart in some. Mesopleural punctures well defined, varying from about two diameters to less than one diameter apart near center. Propodeal dorsum rugose; side ridged. Hindcoxal dorsum with inner margin carinate only basally.

Setae erect on postocellar area, slightly longer than midocellar diameter; suberect on scutum; suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; suberect on midfemoral venter, becoming gradually longer toward femoral apex; inclined obliquely anterad on propodeal dorsum.

Head, thorax, gaster, femora, and tibiae black, mandible reddish at about two thirds of length, tarsal apex brown to reddish. Frontal setae silvery in both sexes. Wing membrane nearly hyaline;

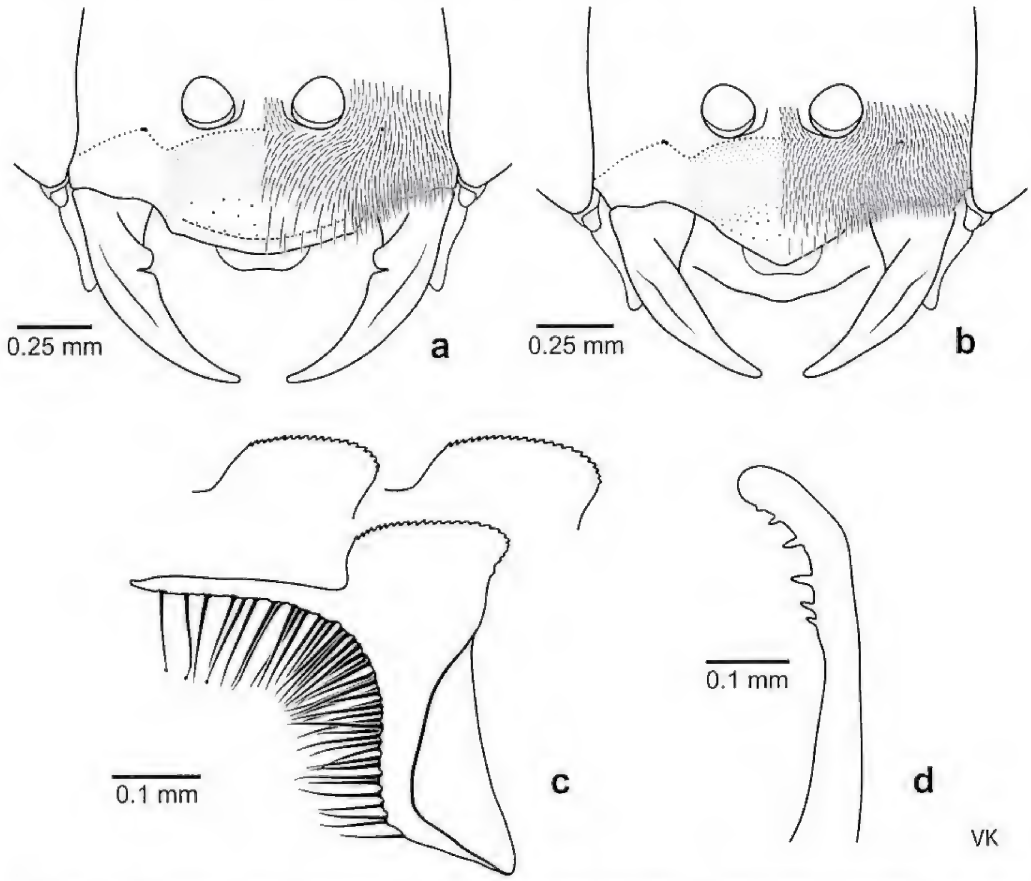


FIGURE 256. *Tachysphex nitidus* (Spinola): a – female clypeus and mandible; b – male clypeus and mandible with outline showing individual variation; c – volsella with outlines showing individual variation; d – penis valve.

costal and subcostal veins of forewing varying from dark brown and black to light brown and brown or to yellowish and brown, respectively. Terga I–III or I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 256a): bevel shorter than basomedian area (except longer along narrow, median zone in some specimens); lip free margin arcuate, not incised laterally. Width of postocellar area 1.3–1.7 × length. Dorsal length of flagellomere I 2.0–2.7 × apical width. Dorsal foretibial surface with one or two inconspicuous spines; outer surface with one spine. Forebasitarsus with 5–7 rake spines (mostly 6). Apical depression of tergum V glabrous in most specimens, but setose in single female from Saqqara, Egypt. Pygidial plate with punctures that average many diameters apart, interspaces unsculptured or aciculate. Length 6.0–7.5 mm.

♂.— Mandible: trimmal carina widely broadened but without tooth or cleft. Clypeus (Fig. 256b): bevel shorter than basomedian area; lip free margin in most specimens pointed and without corner, forming single curved line with rest of clypeal margin (bevel in some specimens with lateral tubercle that may superficially look like lip corner); distance between tubercles up to 1.2 × distance between tubercle and orbit. Width of postocellar area 1.5–2.2 × length. Dorsal length of flagellomere I 1.1–1.3 × apical width, ventral length slightly more to slightly less (0.9–1.1 ×) than apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with up to

three preapical rake spines (without preapical spines on one leg in some specimens); outer apical spine of foretarsomere II markedly shorter than tarsomere III (but as long as tarsomere III in single male from Abu Rawash, Egypt, and another from Palmyra, Syria). Length 4.5–5.7 mm. Volsella and penis valve: Figs. 256c, d.

Nesting behavior.— Observations by Adlerz (1904, as *unicolor*; 1916, as *nitidus*) in Sweden almost certainly refer to this species. The nest, starting from a flat surface, consists of an oblique gallery, 30–37 mm long, and of a single cell that is placed 4 mm below the soil surface. The female performs an orientation flight before she goes hunting. The nest entrance is permanently opened during the provisioning period, but one nest was found closed and empty, and another closed and with two prey but no egg inside. In the latter two cases the temporary closure was probably practiced. The prey, immature acridids, are flown to the nest and held with the wasp's mandible by the bases of their antennae. Upon landing at the nest entrance, the female drops the prey, enters inside, turns around, grasps the grasshopper by the base of an antenna, and drags it inside. The number of prey per cell varies from one to 13. After completing nest provisioning and after ovipositing, the female closes the nest, facing away from the nest entrance, and using her forelegs to project sand under her body into the entrance. Use of hindlegs for nest closing, reported by Carpenter (1930), is almost certainly a mistake. Observations by Deleurance (1946) probably refer to *unicolor*.

Geographic distribution (Fig. 257).— Canary Islands, North Africa (Morocco, Algeria, Tunisia, Libya, Egypt), Europe (north to southern Britain, southern Sweden, and southern Finland), Israel, Syria, Saudi Arabia, Kazakhstan, Uzbekistan, Turkmenistan.

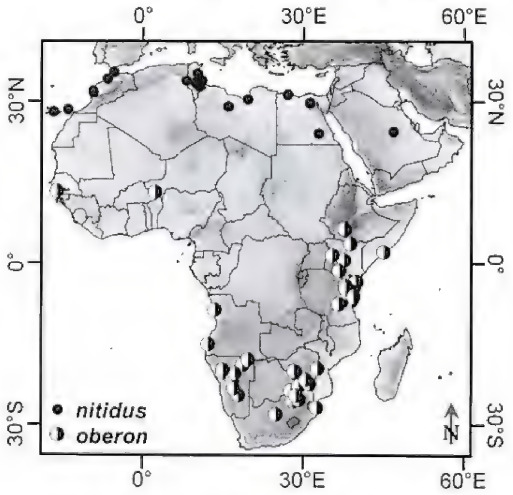


Figure 257. Collecting localities of *Tachysphex nitidus* (only African and Arabian localities) and *oberon*.

Records (only African and Arabian localities).— **CANARY ISLANDS**: **Fuerteventura**: Coti (1 ♀). **Tenerife** (Pulawski, 1971): Adeje, Los Christianos. **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash (1 ♂), Saqqara (1 ♀). **Aswan**: Aswan (4 ♀). **Matruh**: 20–25 km W Marsa Matruh (1 ♀), 25–30 km W Marsa Matruh (1 ♀; 1 ♀, MSNT). **LIBYA**: **Cyrenaica**: Brega. **Tripolitania**: Hon oasis (1 ♀). **MOROCCO**: Agadir (2 ♀, 2 ♂), Kenitra (1 ♂), Marrakech: Oued Tensift (1 ♂), Tetouan (1 ♀). **SAUDI ARABIA**: Al Ha'ir (1 ♂; 1 ♀, 1 ♂, KMG). **TUNISIA**: Djerba Island: SE Haut Souk at 33°52′N 10°55′E (1 ♀, 1 ♂; 1 ♂, CSE) and Rass Rmel Peninsula (2 ♀, 1 ♂, CSE), Kheddache 6 km W Beni at 33°15′N 10°08′E (1 ♂; 2 ♂, CSE), 20 km W Matmata at 33°33′N 9°45′E (1 ♂, CSE), 10 km SE Tataouine at 32°51′N 10°30′E (1 ♀, CSE), Tozeur (1 ♀).

Tachysphex notogoniaeformis Nadig

Figures 258, 259.

Tachysphex notogoniaeformis Nadig, 1933:80, ♂. Holotype: ♂, Morocco: Tizi n'Tichka (originally coll. Nadig, now Zurich Univ.), examined before 1971.— de Beaumont, 1947c:662 (redescription), 1950a:405 (Algeria), 1955a:178 (Morocco, description of female); Pulawski, 1971:307 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:275 (listed).

Recognition.— *Tachysphex notogoniaeformis*, ranging from Morocco to Libya, has a convex labrum (protruding beyond the clypeal free margin) and an elongate galea (length equal to 1.2 of

scape). The species is further characterized by a densely punctate scutum (punctures minute, about one diameter apart), the setae adjacent to the hypostomal carina straight and about one midocellar diameter long, and the propodeal dorsum glabrous apicomesally. In addition, it has an infumate wing membrane and all black gaster and tibiae. In the female, the clypeal lip is evenly arcuate (emarginate mesally), but minimally sinuous laterally. In the male, the forebasitarsus has two short preapical spines on the outer margin (spine length smaller than basitarsus width), and the outer apical spine of foretarsomere II is markedly shorter than foretarsomere III.

The species is similar to *chephren* and *liriformis*. In *notogoniaeformis*, however, the propodeal dorsum has a glabrous apicomedian area whereas it is all setose in the other two species (with a minimal glabrous area in some *liriformis*). In most *notogoniaeformis*, the midfemoral venter is rounded, whereas it forms an obtuse crest in *chephren*; also, the setae of the postocellar impression in the male are erect, about 0.5 × midocellar diameter long (best seen in ventral oblique view), whereas they are appressed in *chephren* and similar but shorter in *liriformis*. In addition, the dorsal volsellar process (Fig. 258c) is wider than in either *chephren* or *liriformis*.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea densely, minutely punctate, its length equal to 1.2 of scape. Scutal punctures minute, about one diameter apart. Mesopleuron dull, uniformly microsculptured. Propodeal dorsum evenly microareolate; side in female ridged (all or only along dorsal and posterior margins), evenly microsculptured in male. Hindcoxal dorsum with inner margin carinate basally.

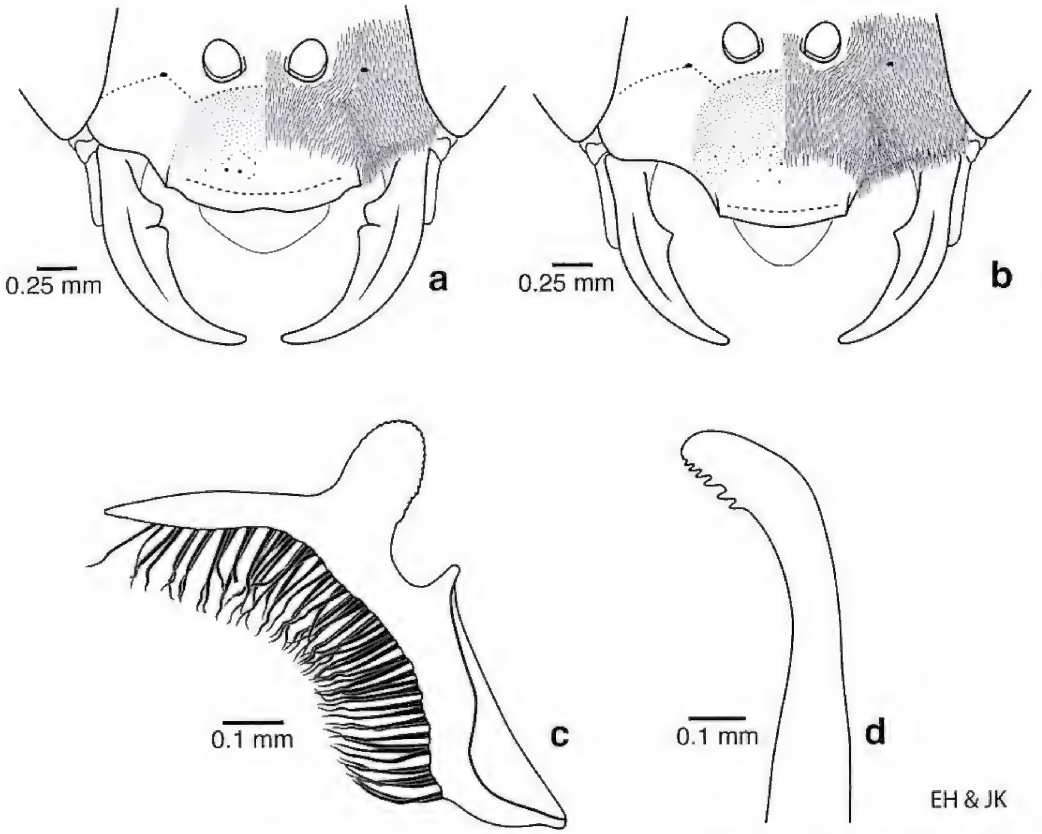


Figure 258. *Tachysphex notogoniaeformis* Nadig: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Setae erect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; appressed on postocellar area in female, in male erect on postocellar impression, about 0.5 × as long as midocellar diameter (best seen in oblique ventral view); appressed on scutum; oriented posterolaterad on propodeal dorsum; apicomedian portion of dorsum glabrous (length of glabrous area about 0.2–0.5 of dorsum).

Head, thorax, legs, and gaster black, mandible reddish mesally, tarsal apex reddish. Frontal setae silvery in both sexes. Wing membrane infumate; costal vein of forewing reddish brown to brown, subcostal vein brown to black. Terga either nonfasciate or terga I and II or I–III silvery fasciate apically.

♀.— Clypeus (Fig. 258a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, with minimal sinuosity laterally. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 3.3–3.5 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two or three spines. Forebasitarsus with seven or eight rake spines. Apical depression of tergum V asetose (except mesally) in specimen from Garian, Libya, and all setose in that from Ait Saoun, Morocco. Pygidial plate with punctures that average many diameters apart (denser near margin); interspaces unsculptured. Length 10.5–14.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 258b): bevel about as long as basomedian area, delimited laterally by oblique carina that emerges from lip corner; lip free margin arcuate, shallowly emarginate mesally in some specimens, with well-defined corner; distance between corners practically equal to distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 1.2–1.4 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with two preapical spines that are shorter than basitarsus width; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Length 8.0–12.0 mm. Volsella and penis valve: Figs. 258c, d.

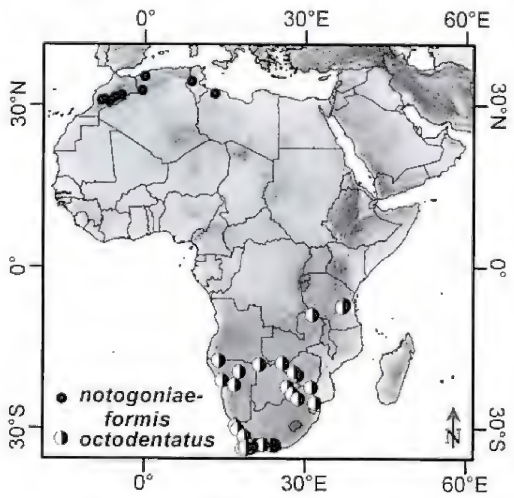


FIGURE 259. Collecting localities of *Tachysphex notogoniaeformis* and *octodentatus*.

GEOGRAPHIC DISTRIBUTION (Fig. 259).— Morocco to Libya.

RECORDS.— **ALGERIA**: Ain Sefra (de Beaumont, 1947c), Bou Hanifia (de Beaumont, 1950a). **LIBYA**: Garian (1 ♀). **MOROCCO**: Ait Saoun at 30°44′N 6°38′W (1 ♀, 1 ♂), Gorges du Todra at 31°36′N 36°00′W (1 ♂), Ijoukak (1 ♂), Ksar es Souk (1 ♂), Tizi n'Tichka (Nadig, 1933). **TUNISIA**: Gafsa (de Beaumont, 1947c).

Tachysphex oberon Arnold

Figures 257, 260.

Tachysphex oberon Arnold, 1923a:161, ♀ (as *Oberon*, incorrect original capitalization). Holotype: ♀, Zimbabwe: Sawmills (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:275 (listed).

RECOGNITION.— The female of *oberon* has short tarsi (e.g., the length of foretarsomere II and of midtarsomere III is about equal to the apical width), a black gaster and yellowish wings, a labrum

whose free margin is arcuate mesally rather than pointed, a galea about as long as wide in profile, an evenly punctate scutum and mesopleuron, and the pygidial plate with punctures that are several to many diameters apart mesally. The legs vary from all black to all red. Specimens with black legs resemble *tembe* and can be differentiated by the characters given in the Key section (p. 44). Specimens with red legs are similar to *saevus*, but have the clypeal free margin evenly arcuate mesally (exceptionally with three median teeth), mesopleural punctures no more than one diameter apart and the interspaces almost unsculptured, shiny, the propodeal side ridged at least anteriorly, and the pygidial plate sparsely punctate mesally (punctures averaging more than one diameter apart). In *saevus*, the clypeal free margin is obtusely pointed mesally; the mesopleural punctures are more than one diameter apart at center and the interspaces are conspicuously microsculptured, dull; the propodeal side is not ridged; and punctures of the pygidial plate average less that one diameter apart (at least mesally).

The male of *oberon* lacks prominent distinctive features, but can be recognized by the following combination: gaster all or partly red, femora red at least apically, tibiae all red; mesopleural punctures well defined; foretarsus without rake; and setae oriented posterad on the propodeal dorsum (basomedian setae oriented anteromesad in many specimens). Some *harpax* are similar, but in *oberon* flagellomere I is short (ventral length minimally shorter to slightly longer than apical width), setae are erect on the postocellar area (but no longer than one midocellar diameter), length of midtarsomere II is 1.5–2.1 × apical width, and the apical tarsomeres each with at most one preapical spine on the venter; also, the labral setae are usual, long and thin. In *harpax*, the ventral length of flagellomere I is 1.3–1.5 × the apical width, setae are appressed on the postocellar area, length of midtarsomere II is more than twice length, each apical tarsomere has a ventral group of preapical spines, and the labral setae are short, stout (as in Fig. 178c).

Both sexes of *oberon* closely resemble *mashona*, but their supraantennal swelling is only slightly more prominent than average for the genus, and the rim of the antennal socket is about the same height ventrally and dorsally. In *mashona*, the supraantennal swelling is unusually large, and the rim is expanded dorsally.

Description.— Galea in profile about as long as wide, about as long as 0.5 of scape. Supraantennal swelling slightly more prominent than average for the genus. Scutal punctures well defined, averaging about one diameter apart; interspaces inconspicuously microsculptured; in female, most punctures small, but some punctures distinctly larger, many diameters apart. Mesopleural punctures well defined, averaging about one diameter apart (less than that anterad of episternal sulcus); interspaces shiny. Propodeal dorsum evenly microareolate; side inconspicuously ridged in anterior half or less in most specimens, but finely ridged throughout in many Ethiopian and most Kenyan specimens (ridges absent in several males from Kenya). Hindcoxal dorsum with inner margin carinate basally. Sternum I with ill-defined longitudinal carina (carina well defined apically in some males).

Setae suberect on each side of oral fossa next to occipital carina (setal length up to about 0.3 of basal mandibular width); erect on postocellar area, about one midocellar diameter long; appressed on scutum; on propodeal dorsum oriented posterad at least apicomesally (oriented anteromesad near propodeal base mesally, largely so in single male from Niger).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in male; all thoracic setae golden in fresh males from Kenya and Tanzania. Wing membrane yellowish (markedly darkened in distal half in Kenyan specimens); forewing costal and subcostal veins reddish brown. Color of femora and gaster: see below. Terga I–IV (I–III in some males) silvery fasciate apically, but fasciae golden and inconspicuous in most Kenyan males.

♀.— Clypeus (Fig. 260a): bevel about as long mesally as basomedian area; lip free margin

arcuate, somewhat produced mesally (with three teeth in single female from Tembe Elephant Park), with at least one adlateral and one lateral incision on each side (adlateral incision may be reduced to sinuosity). Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 1.3–1.4 × apical width. Forefemoral venter minutely punctate, punctures several to many diameters apart; interspaces shiny. Dorsal foretibial surface with a few subereet, inconspicuous bristles; outer surface less densely punctate than remaining surface, with a few, fine but conspicuous bristles. Tarsi short: length of fore- and midtarsomeres II about 1.0 and 1.6 × apical width, respectively; that of midtarsomere III equal to apical width; of fore-, mid-, and hindtarsomeres IV about 0.9, 0.9, and 1.0 × apical width, respectively. Forebasitarsus: apical margin shallowly, roundly emarginate (as in Fig. 54d); outer margin with 9–11 rake spines; four apical spines with basal sockets contiguous or nearly so; spine length about 1.5 × basitarsus width. Apical tarsomeres stout, without spines on venter or lateral margins or with one lateral spine on one side of some tarsomeres. Apical depression of tergum V largely glabrous mesally, setose laterally. Pygidial plate with punctures that are more than one diameter apart mesally, but averaging about one diameter apart near margin and apex; apex emarginate. Length 7.8–10.3 mm. Gaster and legs black in most specimens (including tarsi), but femora, tibiae, and tarsi red in Ethiopian females, in one from Marich Pass, Kenya, and in one from Bubye area, Zimbabwe.

♂.— Mandible: trimmal carina with obtuse tooth, cleft present only in some Ethiopian specimens. Clypeus (Fig. 260b): bevel somewhat ill defined, shorter than basomedian area; lip free margin arcuate to obtusely angulate, with corner mostly well defined (although not prominent), but ill defined in some specimens; distance between corners 0.7–1.0 × distance between corner and orbit,

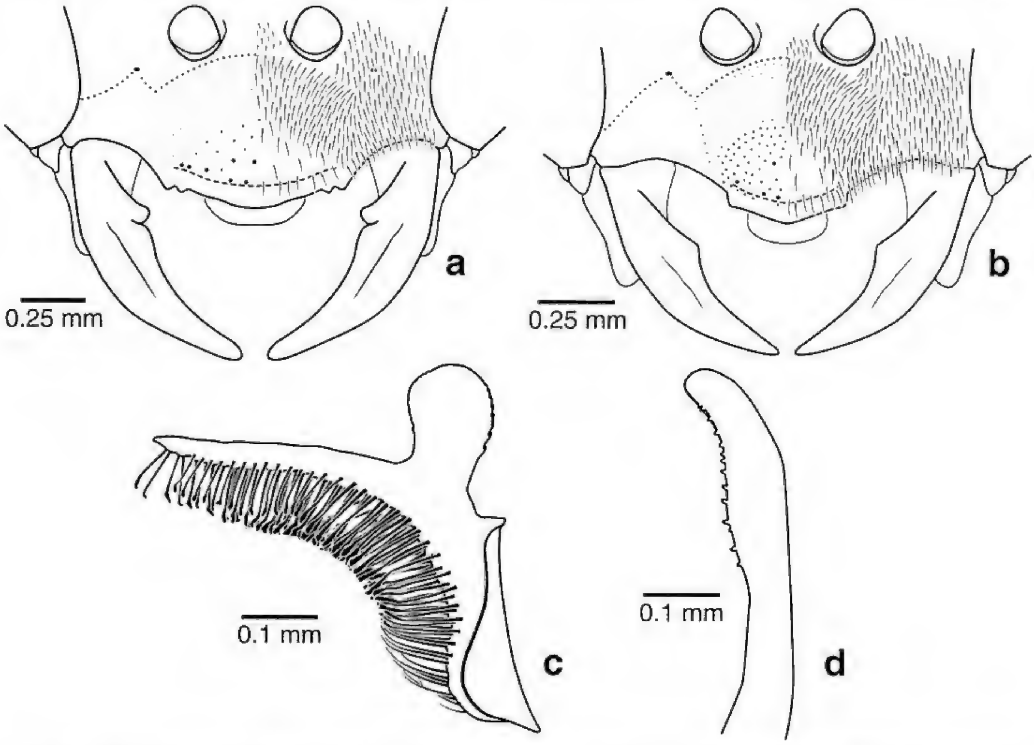


FIGURE 260. *Tachysphex oberon* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

but up to 1.1 × in some males from Zanzibar. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.2–1.3 × apical width, equal to 0.7 of II; ventral length slightly less to slightly more than apical width (up to 1.1 ×). Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines. Midtarsus varying in length: that of tarsomere II 1.5–2.1 × apical width, that of tarsomere III 1.2–1.4 × apical width. Venters of tarsomeres V each with one or none preapical spine. Sternal punctures becoming markedly larger toward gastral apex; in Ethiopian, many Kenyan specimens, and that from Niger, several to many diameters apart on sterna III–VI or IV–VI anterad of apical depression. Sterna III–VI with setae suberect in apical half (all appressed in some specimens from Angola). Sternum VIII with apical margin nearly evenly emarginate in most specimens, tridentate in some (middle tooth varying from inconspicuous to as large as lateral one). Length 6.0–9.5 mm. Volsella and penis valve: Figs. 260c, d. Femora mostly all red or black only basally, but nearly all black (with red apex) in many specimens from Zanzibar; tibiae and tarsi red. Gastral terga I and II or I–III red (tergum I only posteromesally and tergum II only mesally in some specimens from Zanzibar); remainder mostly brown or black, but all gaster red in specimens from Ethiopia, that from Niger, most from Kenya, and some from Angola.

NEST AND PREY.— A nesting colony of *oberon* was found on the southern sandy bank of the Morun River, opposite Marich Pass Field Studies Centre, Kenya, in November 2002. The females nested on a slightly oblique slope along a small, shallow, dry irrigation canal. They were flying low over the ground in irregular circles and zigzags, inspecting low, erect plants, lowest branches of the acacias (just above the ground) or searching under small, dry twigs or pieces of bark or dry leaves (disappearing on one side and reappearing on the other). They also frequently entered what appeared to be their own nests or perhaps some other wasps' open nests. Michael A. Prentice captured a female on 27 November 2002 as she was flying with her prey, a young gryllid nymph, under her body. At two instances we saw a female with prey enter an open gallery (without stopping at the entrance), but our attempts to excavate the nests failed.

GEOGRAPHIC DISTRIBUTION (Fig. 257).— Gambia to Somalia, south to Namibia and northeastern South Africa.

RECORDS.— **ANGOLA**: Giraul River 10 mi NE Namibe (4 ♂, BMNH), 18 mi NE Luanda (1 ♂). **ETHIOPIA**: **Gamo Gofa**: 42 road km NNE Arba Minch (2 ♀, 1 ♂), 58 road km NNE Arba Minch (1 ♂), 49 road km SE Sodo (2 ♀, 18 ♂; 2 ♂, AAU). **Sidamo**: 26 km N Moyale (2 ♂). **GAMBIA**: Keneba (1 ♀, BMNH). **KENYA**: **Coast Province**: Diani Beach in Kwale District (1 ♀, 1 ♂), 20 mi S Mombasa (3 ♀, 2 ♂, USNM), Ukunda at 4°18′S 39°33′E (1 ♀, 2 ♂, USNM), Voi area (1 ♀, 6 ♂, OÖLM), Watamu at 3°23′S 39°59′E (6 ♂) and 3°23′S 40°00′E (1 ♂, MSNT). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♀). **Rift Valley Province**: Marich Pass area 4 km N road to Sigor (1 ♀, 5 ♂), Marich Pass Field Studies Centre (33 ♀, 87 ♂; 2 ♀, 1 ♂, AMNH; 3 ♂, BMNH; 2 ♂, CNC; 2 ♀, 2 ♂, MNHN; 4 ♂, MSNT; 5 ♂, NHMW; 4 ♂, NHMZ; 6 ♂, RMNH; 10 ♂, SAM; 3 ♂, UCD), Ngong Forest Station 6 mi S Nairobi (1 ♀, 1 ♂, USNM), Sokoke Forest in Kilifi District (2 ♀, LACM). **NAMIBIA**: **Grootfontein District**: 90 km NE Grootfontein (1 ♀, JG). **Karibib District**: Khan River 23 km N Karibib (2 ♂). **Khorixas District**: 2 km W Khorixas (1 ♂). **Mariental District**: Mariental (1 ♂, AMG). **Okahandja District**: Okahandja (2 ♂, BMNH), Waldau River 17 km W Okahandja (2 ♂). **Otjiwarongo District**: Waterberg (1 ♂, CSE). **Outjo District**: 31 km SE Kamanjab (1 ♂). **Rehoboth District**: 9 km S Rehoboth (2 ♂, MS). **Rundu District**: Rundu (1 ♀, MS). **NIGER**: Say (1 ♂, KMG). **SOMALIA**: Afgoi (1 ♂, RMNH). **SOUTH AFRICA**: **Gauteng**: Pretoria: Botanical Garden (1 ♂); Tswaing (1 ♀; 2 ♀, PPRI). **Kwazulu-Natal**: Tembe Elephant Park (1 ♀, OÖLM). **Mpumalanga**: Loskop Dam Nature Reserve (3 ♀, 3 ♂, PPRI). **Northern Province**: D'Nyala Nature Reserve (1 ♂, PPRI), Langjan Nature Reserve (1 ♀, PPRI), Nylsvley Nature Reserve (1 ♂, FSCA), Pafuri in Kruger National Park (1 ♂, PPRI), Vaalharts [= Vaal River irrigation scheme, probably near Hartswater] (1 ♂, PPRI). **TANZANIA**: **Coast Region**: Pugu Forest near Kisarawe (1 ♂). **Kilimanjaro Region**: Kisiwani 27 km SE Same (1 ♀, 3 ♂), 19 km SE Same (1 ♀, 1 intersex). **Morogoro Region**: 62 road km SW Morogoro (1 ♂), Udzungwa National Park 132 km E Iringa (1 ♂). **Tanga Region**: 30 km SW Korogwe (1 ♂), 10 km WNW Mabokweni (4 ♀,

32 ♂; 5 ♂, UDS), 2 km NE Mkomazi (3 ♂), Pangani River Camp 86 km NW Korogwe (1 ♂). **Zanzibar Region**: Unguja (= Zanzibar Island): Chwaka (3 ♂; 5 ♂, MSNT). **ZIMBABWE**: Bubye River 80 km NE Beit Bridge (1 ♀, OÖLM), Bulawayo (1 ♀, SAM, holotype of *oberon*), Penkridge (3 ♂, SAM), Redbank at Kami River (3 ♀).

Tachysphex octodentatus Arnold

Figures 259, 261, 262.

Tachysphex octodentatus Arnold, 1924:62, ♀, ♂. Lectotype: ♀, Zimbabwe: Sawmills (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:275 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex octodentatus var. *inermis* Arnold, 1924:63, ♀. Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined. **New synonym**.— As *Tachysphex octodentatus inermis*: Bohart and Menke, 1976:275 (new status, listed).

Tachysphex tridentatus Arnold, 1924:55, ♀, ♂. Lectotype: ♂, Zimbabwe: Bulawayo (SAM), **here designated**, examined. **New synonym**.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed).

Species 1 (part): van Noort, Prinsloo, and Compton, 2000:348 (Namibia), **present correction**.

LECTOTYPE SELECTION.— Arnold (1924) labeled a female and a male as types of each *octodentatus* and *tridentatus*, and the remaining specimens examined as paratypes. I have selected the female in each pair as the lectotype of the respective nominotypical species, and the male as the paralectotype.

RECOGNITION.— *Tachysphex octodentatus* is an all black species with unusual sternal punctation (punctures well defined and relatively large on sterna I and II and gradually decreasing in size on the following sterna). The thickened male hindtibial spurs (Figs. 262b, c) are unique within the genus. Subsidiary recognition features are: scutal hindcorner more prominent than in most other species (as in Fig. 334a), hindcoxal dorsum with prominent basal tooth (Fig. 262a) except non-prominent in smallest males, apical tarsomeres without spines on venter or lateral margins, and female labrum and clypeal lip emarginate mesally (Figs. 261a).

JUSTIFICATION OF NEW SYNONYMY.— The type series of *octodentatus* and of *tridentatus* are certainly conspecific. The two names were published simultaneously, and I select the former as valid and the latter as its junior synonym.

The holotype of the var. *inermis* is merely an old specimen, with worn off wing tips and clypeal free margin. The supposed unusually short clypeal teeth that flank the mesal emargination actually result from abrasion.

DESCRIPTION.— Mesothoracic punctures well defined, relatively large, interspaces shiny; scutal punctures averaging about one diameter apart in some specimens, about two diameters in others; mesopleural punctures averaging about one diameter apart in female, less than that in male. Hindcoxal dorsum with inner margin carinate, carina prominently expanded basally (Fig. 262a) except in smallest males. Scutal hindcorner roundly prominent (as in Fig. 334a). Propodeal dorsum rugose, side ridged. Sternal punctures well defined, conspicuous on sterna I and II, gradually decreasing in size on following sterna.

Setae (numbers represent setal length expressed as a fraction of basal mandibular width): erect on postocellar area (0.6–0.7); suberect on each side of oral fossa next to occipital carina (0.4), on scutum (0.3–0.4 anteriorly), and on midfemoral venter (0.2–0.3, or about one midocellar diameter); on propodeal dorsum slightly inclined posterad except slightly inclined anterad basomedially (about 0.5).

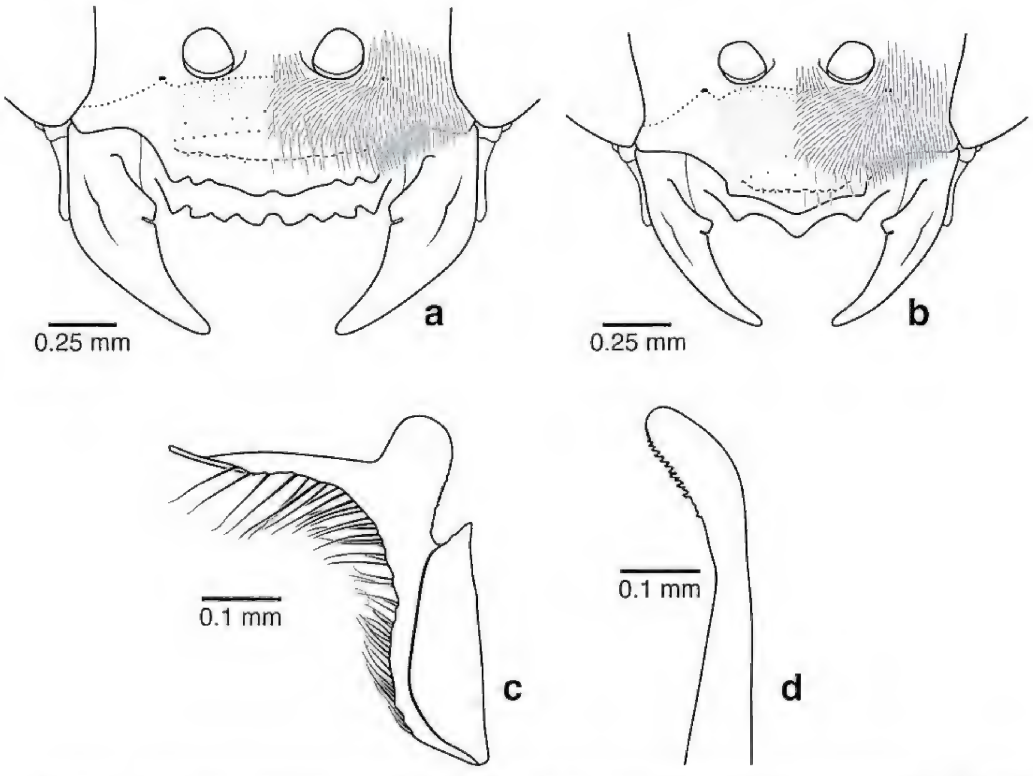


FIGURE 261. *Tachysphex octodentatus* Arnold: a – female clypeus and mandible with outline showing variation of clypeal free margin; b – male clypeus and mandible with outline showing variation of clypeal free margin; c – volsella; d – penis valve.

Head, thorax, gaster, and legs black, mandible reddish mesally, tarsi reddish except basally in most specimens. Frontal setae silvery in both sexes. Wing membrane hyaline; forewing costal vein light brown, subcostal vein brown. Terga I–III silvery fasciate apically in both sexes.

♀.— Labrum emarginate mesally. Clypeus (Fig. 261a): middle section slightly convex, bevel about as long as basomedian area; lip free margin arcuate, emarginate mesally, with one or two lateral incisions on each side (dentate in most specimens); both mesal emargination and lateral incisions varying from deep to shallow. Width of postocellar area 1.4–1.5 × length. Dorsal length of flagellomere I 1.7–1.8 × apical width. Forefemoral venter minutely punctate, punctures several diameters apart. Dorsal foretibial surface with one spine; outer surface with two preapical spines. Forebasitarsus with six rake spines. Apical hindtarsomere in some specimens with one small spine on each lateral margin. Apical depression of tergum V sparsely setose. Length 7.3–10.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 261b): bevel varying from nearly absent to about as long as basomedian area; lip free margin markedly sinuate to sharply pointed mesally; corner well defined, sharply prominent in many specimens (then lobe free margin tridentate); distance between corners 1.1 × distance between corner and orbit. Width of postocellar area 1.5–1.8 × length. Dorsal length of flagellomere I 1.2–1.3 × apical width. Forefemoral notch glabrous. Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindtibial spurs thickened (Figs. 262b, c). Length 4.9–8.0 mm. Volsella and penis valve: Figs. 261c, d.

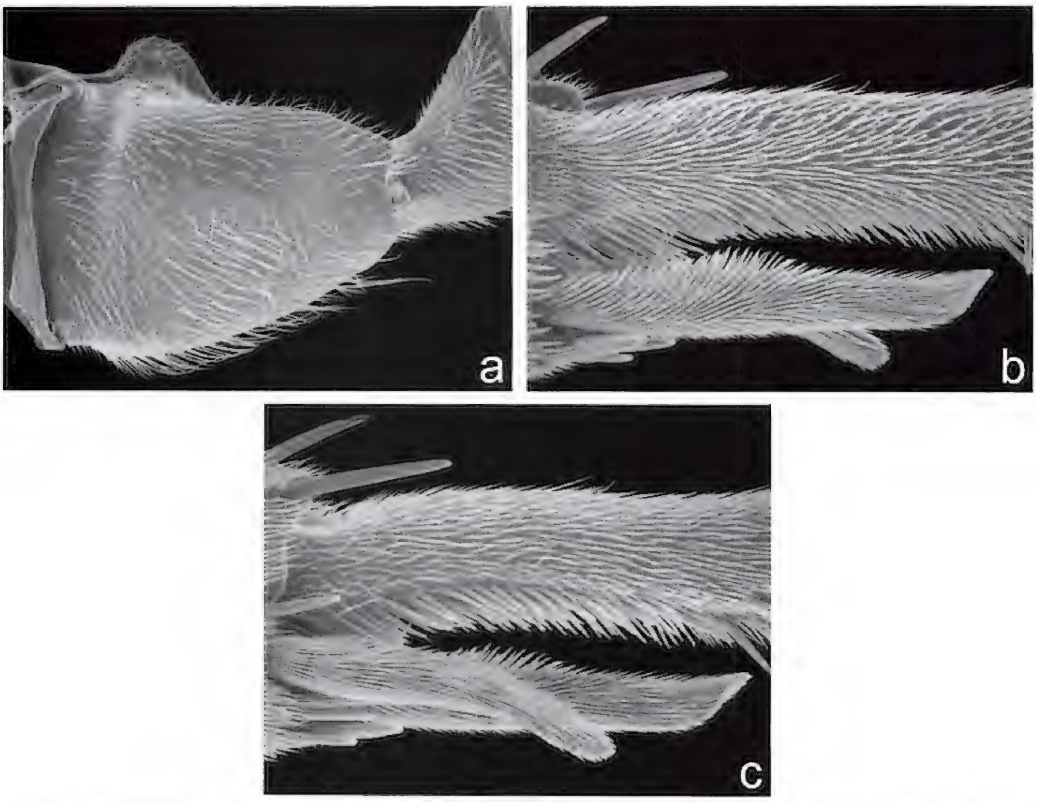


FIGURE 262. *Tachysphex octodentatus* Arnold: a – female hindcoxa (×55); b – male hindtibial spur, outer side (×250); c – male hindtibial spurs, inner side (×250).

GEOGRAPHIC DISTRIBUTION (Fig. 259).— Tanzania to Namibia and South Africa.

RECORDS.— **BOTSWANA**: Serowe (1 ♀, 7 ♂). **NAMIBIA**: **Khorixas District**: Brandberg: Plateau valley (3 ♂, SAM, determined Species 1 by van Noort, Prinsloo, and Compton, 2000). **Okahandja District**: Okahandja (1 ♂, BMNH). **Opuwo District**: Ondorusu Falls (1 ♀, NMN). **Rundu District**: Popa Falls (2 ♀, NMN). **Tsumeb District**: Ghaub (1 ♀; 1 ♀, 1 ♂, PPRI). **SOUTH AFRICA**: **Eastern Cape Province**: 6 km N Steytlerville (2 ♂, USU), 9 km E Willowmore (1 ♀, 1 ♂), 37 km NW Willowmore in Grootrivierberg Range (1 ♀, USU). **Mpumalanga**: Crocodile Bridge in Kruger National Park (2 ♀, PPRI). **Northern Cape Province**: Buffels 50 km SW Springbok (1 ♀, 1 ♂, OÖLM), 25 km E Hondeklipbaai (1 ♂, OÖLM). **Northern Province**: Afgun (1 ♂, AMG), Ellisras: Hope (1 ♂, AMG), 10 km SW Naboomspruit (1 ♀, FSCA), Pafuri in Kruger National Park (1 ♀, PPRI). **Western Cape Province**: Cape Town: Table Mountain at 33°57′S 18°24′E (1 ♀, 5 ♂), Clanwilliam: Bulshoek (1 ♂, SAM), Huguenot (1 ♂, BMNH), Kobee 10 km NE Vanrhynsdorp (1 ♂, OÖLM), Laingsburg at 33°12′S 20°51′E (1 ♂), Matjiesfontein (2 ♂; 1 ♀, 3 ♂, BMNH), 5 km W Robertson (1 ♂), Stellenbosch: Jonkershoek Reserve (1 ♀, PMA), Tierberg Farm 23 km NE Prince Albert (1 ♀, 3 ♂), 8 mi NE Touwsrivier (1 ♂, SAM), Wellington: Rooshoek (2 ♂; 1 ♀, 4 ♂, RMNH). **TANZANIA**: **Morogoro Region**: 48 km W Morogoro (1 ♀, 1 ♂), 62 road km SW Morogoro (3 ♂), Ruaha River bank 7 km S Mikumi (1 ♂). **ZAMBIA**: **Northern Province**: Mbala (2 ♂, SAM). **ZIMBABWE**: Bulawayo (6 ♀, 11 ♂, SAM, including holotype and paratype ♀ of *inermis*; paralectotype ♂ of *octodentatus*, 1 ♀ and 2 ♂ paratypes of *octodentatus*; and lectotype ♂ and paralectotype ♀ of *tridentatus*; 2 ♀, 2 ♂, TMP), Kami Ruins (11 ♀, 25 ♂; 3 ♀, 4 ♂, NHMZ; 3 ♀, 1 ♂, SAM, including paratype ♀ of *octodentatus*; 1 ♀, TMP), Sawmills (1 ♀, 2 ♂, SAM, including lectotype ♀ of *octodentatus* and 1 ♂ paratype of *tridentatus*), Victoria Falls (1 ♀, 1 ♂).

***Tachysphex omoi* Guiglia**

Figures 263, 264.

Tachysphex omoi Guiglia, 1943b:72, ♀. Holotype: ♀, Ethiopia: Gamo Gofa: Condaraba (as Gondaraba) at 4°58′N 36°49′E (GENOVA), examined.— Bohart and Menke, 1976:275 (listed).
Tachysphex omoi Guiglia, 1950:252, ♀. Objective synonym of *Tachysphex omoi* Guiglia, 1943.

Recognition.— *Tachysphex omoi*, from Ethiopia and Kenya, has an all black gaster and femora (except the pygidial plate may be reddish apically), shiny mesopleuron with well-defined punctures, setae erect on the postocellar area (Figs. 263a, b), oriented obliquely anterad and anterolaterad on the propodeal dorsum (except anteriorly), and suberect on the midfemoral venter. Additionally, the labrum is flat, the galea is shorter than wide in profile, hindwing crossvein cu-a is vertical, the middle tarsomeres are not shortened, and the apical tarsomeres are not modified, without ventral spines. The axilla appears to be sloping more steeply laterad than in most other African *Tachysphex*, a character difficult to quantify or illustrate.

Like that of *erythrurus*, the female of *omoi* has the tibiae red (all or partly so). It differs from *erythrurus* in having the middle clypeal section differentiated into a basomedian area and a well-defined bevel (Figs. 263c), antenna black, and at most a part of the pygidial plate red. In the female of *erythrurus*, the basomedian clypeal area and the bevel are not differentiated and the basal flagellomeres and gastral segments V and VI are reddish. Unlike the North African *anubis* and *yarrowi*, the emargination of the clypeal free margin, between the lip and orbit, is not unusually shallow (Fig. 263c), and the mesopleural setae are about as dense as those on the metapleuron and not concealing the integument. The width of postocellar area is 2.1–2.2 × length, whereas 1.5–1.7 × in *consocius*.

The male of *omoi* resembles *consocius* and *diversilabris* in having a longitudinal sulcus on flagellomeres III–IX that separates two differently setose areas (as in Figs. 98c-f). As in *consocius* and unlike *diversilabris*, the clypeal lip has a well-developed corner and is not pointed mesally. Unlike *consocius*, the tibiae of *omoi* are partly red (rather than all black) and the apical margin of sternum VIII is not tridentate (tridentate in most *consocius*).

Description.— Mandible: outer ridge somewhat swollen and expanded over notch. Scutal punctures well defined, averaging about 1–2 diameters apart on disk but up to many diameters apart in some males (interspaces unsculptured, shiny). Axilla somewhat swollen between horizontal portion and lateral slope. Mesopleural punctures markedly finer than those on scutum, averaging 2–3 up to several diameters apart below scrobe (interspaces unsculptured, shiny). Propodeal dorsum irregularly rugose, side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae nearly erect on each side of oral fossa next to occipital carina, about 0.4 × basal mandibular width; erect on postocellar area, about 0.3 × basal mandibular width (Figs. 263a, b); nearly erect on scutum; conspicuous although not concealing integument on mesopleuron; on midfemoral venter suberect to nearly erect, about equal to midocellar diameter; on propodeal dorsum inclined anterad except oriented anterolaterad on side, inclined posterad basomedially, and inclined posterolaterad near spiracle.

Head and thorax black, mandible red (black basally in Kenyan specimens). Frontal setae silvery in both sexes. Wing membrane nearly hyaline; forewing costal vein yellowish brown, subcostal vein brown. Femora black; tibiae varying from largely red (only fore-and midtibial venters darkened) to largely black (fore- and midtibiae reddish basally and apically, hindtibia largely reddish dorsally); tarsi red to almost black. Gaster black, female pygidial plate reddish in apical half to all black; male segment VII reddish in some specimens. Terga I–IV in female, I–V in male, silvery fasciate apically.

♀.— Clypeus (Fig. 263c): lobe relatively short, wide (distance between lip corners about 1.9–2.2 × clypeal midlength); bevel about as long as basomedian area; lip slightly arcuate, not incised laterally in Ethiopian specimens, but minimally emarginate laterally in those from Kenya (emargination can be absent on one side). Width of postocellar area 2.1–2.2 × length (Fig. 263a). Dorsal length of flagellomere I 2.2 × apical width. Forefemoral venter minutely punctate, punctures 2–3 diameters apart. Dorsal foretibial surface without spines or suberect bristles; outer surface setose throughout, without spines or (some specimens) with one spine. Forebasitarsus with six or

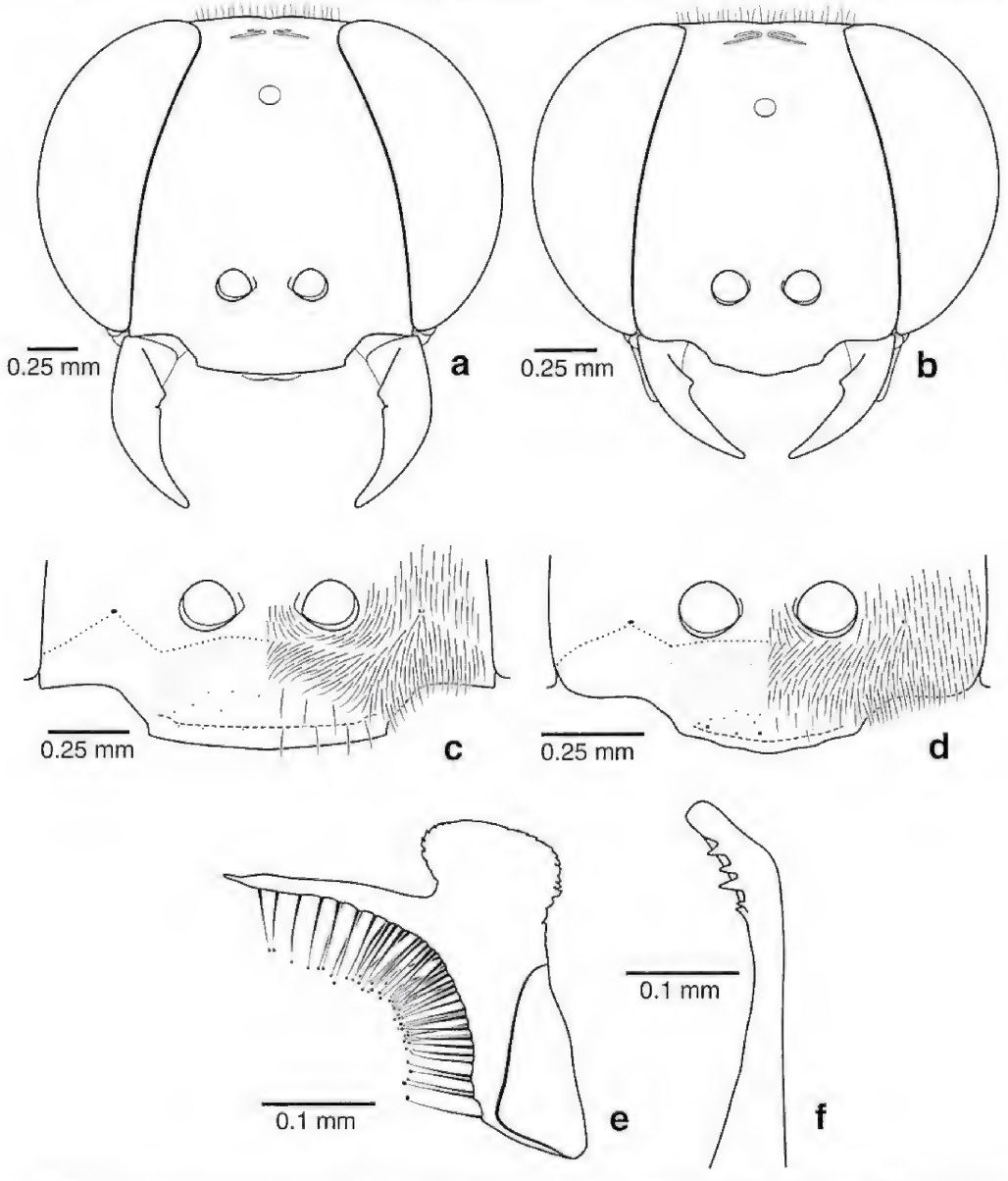


FIGURE 263. *Tachysphex omoi* Guiglia: a – female head in frontal view; b – male head in frontal view; c – female clypeus; d – male clypeus; e – volsella; f – penis valve.

spicuously yellow, contrastingly brown with violet shimmer in apical third or so; forewing costal and subcostal veins reddish. Femora, tibiae, and tarsi red, fore- and midfemora black basodorsally in some males. Gastral terga largely red, but the following are black: female tergum V or terga IV and V (except apical depressions), in male base of tergum I and terga IV and V, and parts of terga II and III to various degree in some females and males; sterna largely black.

♀.— Clypeus (Fig. 265a): bevel about as long as basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width; flagellomeres III–X flattened laterally, with characteristic sensory areas. Midtrochanteral venter with impunctate area. Fore- and midfemora glabrous posteroventrally, with a few, minute punctures that are many diameters apart. Dorsal foretibial surface with a few suberect, inconspicuous bristles; outer surface with three thin spines, otherwise impunctate and glabrous. Forebasitarsus with 10 or 11 rake spines. Tarsi short: length of fore- and midtarsomeres II 0.9–1.1 and 1.5–1.6 × apical width, respectively; that of midtarsomere III 1.0–1.1 × apical width; and that of fore-, mid-, and hindtarsomeres IV about 1.0–1.1, 0.8–0.9, and 1.0 × apical width, respectively. Venter of mid- and hindtarsomeres V with subbasal spine or pair of subbasal spines. Apical depression of tergum V impunctate, glabrous. Pygidial plate punctatorugose, shallowly emarginate apically. Length 11.1–12.3 mm.

♂.— Mandible: trimmal carina with tooth, without cleft (Fig. 265b). Clypeus (Fig. 265b): bevel about as long as basomedian area; lip free margin obtusely pointed mesally, with well-defined corner; distance between corners 0.8–1.0 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.3–1.5 × apical width. Forefemoral notch microscopically setose. Posteroventral forefemoral surface, between notch and apex, impunctate and glabrous or with a few minute punctures that are many diameters apart; midfemoral venter impunctate and glabrous. Outer margin of forebasitarsus without preapical spines or, in some specimens, with one preapical spine next to apical one; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomeres II and III 2.0–2.2 and 1.2–1.3 × apical width, respectively. Apical tarsomeres with varying number of spines on venter. Sterna III–VI with dense, suberect setae that are up to one midocellar diameter long. Sternum VIII tridentate apically. Length 8.9–12.3 mm. Volsella and penis valve: Figs. 265c, d.

Habitat.— The specimens from Tanzania were collected at the sandy bottom of a dry stream. They were flying in straight or circular patterns or sitting on sand, dead leaves, branches, or other objects.

Geographic Distribution (Fig. 264).— Tanzania, Malawi.

Records.— Holotype: ♀, **TANZANIA: Morogoro Region**: 62 road km SW Morogoro, 22–23 July 2001, Omary S. Haji and WJP (CAS). Paratypes: **MALAWI**: Mlanje, 4 Oct 1913, S.A. Neave (2 ♂, BMNH, CAS); Ruo Valley, 25 Oct 1913, S.A. Neave (1 ♂, BMNH). **TANZANIA**: same data as holotype (5 ♀, 37 ♂); same data but 6 July 2001 (1 ♂).

Tachysphex osiris de Beaumont

Figures 264, 266.

Tachysphex osiris de Beaumont, 1940:170, ♀, ♂. Lectotype: ♀, Sudan: Nabardi [= Bir Um-Nabardi 160 km SE Wadi Halfa] (BMNH), designated by de Beaumont, 1947a:179, examined.— Honoré, 1942:56 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:178 (in revision of Egyptian *Tachysphex*), 1950b:18 (Egypt), 1958:61 (Algeria); Pulawski, 1971:422 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:275 (listed); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

Recognition.— *Tachysphex osiris* has the apical depression of sternum I intersected by a longitudinal carina and hindwing vein cu-a oblique (anal end further away from wing base than cubital

end). The female is further characterized by a slightly prominent upper frons, the mesothoracic venter completely concealed by vestiture, absence of spines on the lateral margins of apical tarsomeres, flagellum largely red, and marginal cell sparsely microsetose. As in *grandissimus*, the appressed vestiture conceals integument of the mesopleuron and all or most of the scutum. Because of similar coloration and dense cephalic and thoracic vestiture, the female of *osiris* can be easily confused with *isis*, from which it differs in having a longitudinal carina on sternum I, frons less prominent, propodeal side glabrous along metapleural sulcus, outer surface of the hindfemur not concealed by vestiture, and pygidial plate evenly narrowing posterad (rather than constricted preapically).

FIGURE 266. *Tachysphex osiris* de Beaumont: female in lateral view.

In the male, sternum II is covered with microscopic setae, and sterna III–V have apical, subappressed fringes of dense (as if agglutinated) setae. *Tachysphex grandissimus* is similar, but in *osiris* punctures are about one diameter apart on the scutal disk and several diameters apart on the mesopleuron (except above and just beneath the scrobe), and the frontal setae are golden. In *grandissimus*, scutal and mesopleural punctures are almost compressed against each other, and the frontal setae are silvery. Also similar is *sordidus*, but *osiris* has a well-defined foretarsal rake: outer margin of forebasitarsus with 4–6 rake spines, outer apical spine of foretarsomere II longer than tarsomere III. In *sordidus*, the forebasitarsus has at most one preapical spine (that is located next to the apical spine), and the outer apical spine of foretarsomere II is as long as foretarsomere III or shorter.

DESCRIPTION.— Gena unusually narrow in dorsal view. Scutal punctures nearly compressed against each other in female, about one diameter apart in male; those of mesothoracic venter up to several or many diameters apart in male. Mesopleuron dull, markedly microsculptured, with shallow, ill-defined punctures, but shiny near midcoxa in male. Propodeal dorsum longitudinally ridged to irregularly rugose (ridges and rugae partly effaced in some males), intersecting posterior surface at about right angle; propodeal side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end further away from wing base than cubital end). Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Sternum I with apical depression that is bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae appressed on postocellar area and scutum; erect on each side of oral fossa next to occipital carina (length about 0.4 × basal mandibular width); sinuous, oriented obliquely posterad on propodeal dorsum; in female fully concealing integument on postocellar area, scutum, mesopleuron, and mesothoracic venter. Sternum I largely glabrous in most specimens. Midfemoral venter practically glabrous.

Body coloration: see below. Frontal setae silvery in female, golden in male. Wings hyaline; forewing costal vein yellowish brown, subcostal vein brown.

♀.— Labrum: median notch evanescent. Clypeus: bevel inconspicuous, shorter than midocellar diameter, slightly step-like; lip at most shallowly notched mesally. Width of postocellar area

1.0–1.2 × length. Dorsal length of flagellomere I 1.8–2.1 × apical width. Dorsal foretibial surface with two or three spines; outer surface glabrous, with three spines. Forebasitarsus with 9–11 rake spines. Apical mid- and hindtarsomeres without spines on lateral margins, with a few basoventral spines. Apical depression of tergum V impunctate, glabrous. Length 11.0–13.0 mm. Head and thorax varying from black to red, mandible nearly black in apical third; antenna all red or flagellum almost black. Gaster and legs red. Terga I–V silvery fasciate apically.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel markedly shorter than basomedian area; free margin of lobe arcuate or slightly sinuate, with well-defined corner, distance between corners 1.2 × distance between corner and orbit. Width of postocellar area 0.9 × length. Dorsal length of flagellomere I 1.8–2.0 × width. Forefemoral notch asetose, proximally with one or a few erect setae. Outer margin of forebasitarsus with 4–6 rake spines, outer apical spine of foretarsomere II longer than tarsomere III. Sternum II uniformly microsetose throughout; apical depressions of sterna III–V with subappressed, dense, as if agglutinated setae that are markedly longer than on remaining surface, remaining surface punctate to largely impunctate. Length 8.1–10.0 mm. Volsella and penis valve as in *costae* (Figs. 102b, c). Head and thorax black, mandible largely red, pronotal lobe brown in some specimens. Femora black, red apically, tibiae and tarsi red. Gastral segments I–III red or gaster all black. Terga I–III silvery fasciate apically.

FLORAL RECORDS.— The specimens from Bahariya oasis were collected on flowers of *Cornulaca monacantha* Delile (Chenopodiacee), as recorded by J.M. Carpenter and A. Davidson, the collectors.

GEOGRAPHIC DISTRIBUTION (Fig. 264).— Egypt and Sudan to Chad and Algeria.

RECORDS.— **ALGERIA**: El Bioth (de Beaumont, 1947a), Tassili des Ajjer: reg between oueds Sersouf and Isandilène (de Beaumont, 1958) and Toukmatine (1 ♀, OÖLM). **CHAD**: Bir Nazara in Borkou Range (1 ♂). **EGYPT**: **Al Jizah** (= Ghiza): Ghiza (de Beaumont, 1947a), [Ghiza] Pyramids (1 ♀, NHMW). **Aswan**: Aswan (de Beaumont, 1947a), Korosko to Abu Hamed (2 ♂, BMNH). **Matruh**: NW Bahariya oasis at 29°12′21″N 28°51′41″E (4 ♀, 2 ♂; 8 ♀, 4 ♂, AMNH); Sitra in Siwa oasis (1 ♀, BMNH). **Sawhaj**: 4 km W Abydos (3 ♂). **Sina** (= Sinai): no specific locality (Roche and Zalat, 1994). **LIBYA**: **Cyrenaica**: Djarabub (de Beaumont, 1947a). **SUDAN**: Nabardi = Bir Um-Nabardi 160 km SE Wadi Halfa (1 ♀, 1 ♂, BMNH, including lectotype of *osiris*).

Tachysphex ovambo Pulawski, sp. nov.

Figures 267, 268.

DERIVATION OF NAME.— Named after the Ovambo people of southwestern Angola and northwestern Namibia; a noun in apposition to the generic name.

RECOGNITION.— The female of *ovambo* has an enlarged supraantennal swelling (Fig. 267c) that is not fused with the antennal socket rim, shortened legs (e.g., length of midtarsomeres II and III is 1.8 and 1.3 × the apical width, respectively), and a densely punctate pygidial plate (Fig. 267d). Additionally, the setae of the propodeal dorsum are inclined posterad, the gaster is all black, and terga I–IV are silvery fasciate apically. Females of *bipustulosus* and *mashona* also have enlarged supraantennal swellings, but their tarsi are even shorter (length of midtarsomeres II and III, respectively, 1.4–1.6 and 1.0 × apical width). Also, the supraantennal swelling of *ovambo* is lower than in *bipustulosus*, with sides rounded rather than nearly vertical, not fused with the antennal socket rim (fused in *mashona*), and the femora and tibiae are red (black or red in *bipustulosus*, black in *mashona*).

The male of *ovambo* has the following unique combination: flagellomere I short (dorsal length about 0.75 of flagellomere II), supraantennal swelling slightly but visibly enlarged, and each apical tarsomere with one or two apicoventral setae. Subsidiary recognition characters include a black

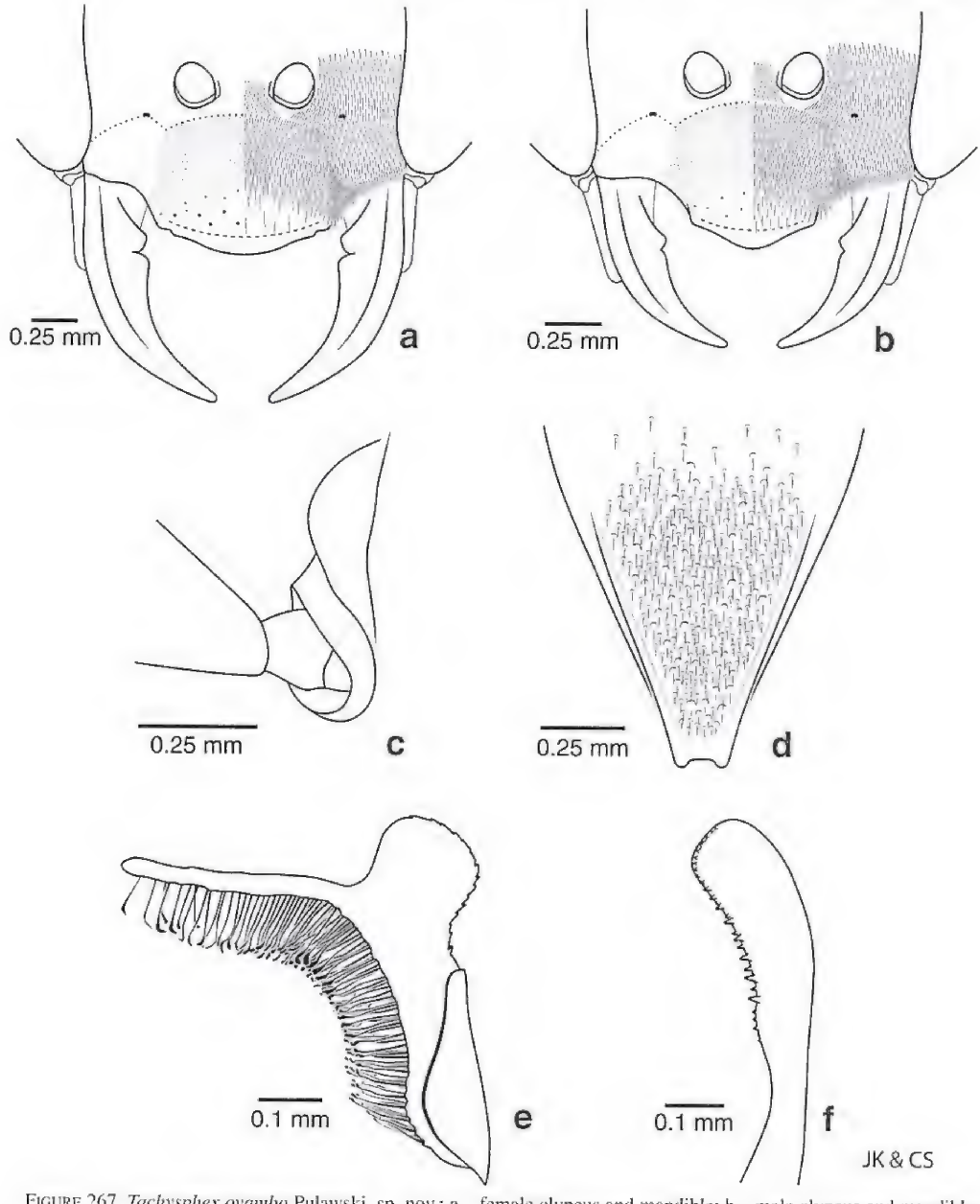


FIGURE 267. *Tachysphex ovambo* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – female supraantennal swelling and base of antenna; d – pygidial plate; e – volsella; f – penis valve.

gaster with silvery fasciate terga I–IV, obtusely pointed clypeal lip, and setae of the propodeal dorsum all inclined posterad.

DESCRIPTION.— Galea slightly longer than wide in profile, as long as 0.7 of scape. Supraantennal swelling enlarged in female (Fig. 267c), only slightly so in male, not connected to antennal socket. Scutum evenly, minutely punctate (punctures averaging about one diameter apart),

in female also with ill-defined, large punctures that are many diameters apart. Mesopleural punctures larger than those on scutum, about one diameter apart below scrobe; interspaces microsculptured. Episternal sulcus complete in female, incomplete in male. Propodeal dorsum evenly microareolate; side finely punctate at center, finely ridged along metapleural sulcus and posterior edge. Hindwing crossvein cu-a either vertical or slightly inclined (anal end slightly further away from wing base than cubital end). Hindcoxal dorsum carinate basally. Sternum I not carinate except apical depression with median carina.

Setae erect on each side of oral fossa next to occipital carina (setal length about 0.3 × basal mandibular width); erect, about one midocellar diameter long on postocellar area; appressed on scutum; inclined posterad on propodeal dorsum.

Head and thorax black, mandible dark reddish mesally. Frontal setae silvery in both sexes. Wing membrane infumate; costal and subcostal veins of forewing brown. Leg coloration: see below. Gaster all black or female pygidial plate reddish. Terga I–IV silvery fasciate apically.

♀.— Labrum shallowly, broadly emarginate. Clypeus (Fig. 267a): bevel as long as basomedian area or shorter; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.3 × length. Dorsal length of flagellomere I 1.6–1.8 × apical width; flagellomeres III–X slightly flattened, each with sensory area ventrally. Fore- and midfemoral venters aciculate, with minute punctures that are several diameters apart and also with a few large punctures. Dorsal foretibial surface setose, without spines or suberect bristles; outer surface with two bristles. Tarsi short: length of fore- and midtarsomeres II about 1.2 × and 1.8 × apical width, respectively; that of midtarsomere III 1.3 × apical width; of fore-, mid- and hindtarsomeres IV about 1.0, 1.0, and 1.2 × apical width, respectively. Forebasitarsus with 10 or 11 rake spines. Venters of apical tarsomeres each with one or two small spines. Apical depression of tergum V punctate throughout (punctures difficult to see from certain angles). Pygidial plate (Fig. 267d) emarginate apically, with small punctures that average one diameter apart or less (punctures absent along margin) and also with large punctures that average several to many diameters apart. Length 9.3–10.3 mm. Femora all red or forefemur black basally and midfemur black basodorsally. Tibiae red, tarsi red or dark brown.

♂.— Mandible: trimmal carina with obtuse tooth and cleft. Clypeus (Fig. 267b): bevel ill defined or absent, delimited anterolaterally by small carina that emerges from lip corner; lip free margin obtusely pointed, with well-defined corner; distance between corners 1.0–1.1 × distance between corner and orbit. Width of postocellar area 1.0–1.1 × length. Dorsal length of flagellomere I 1.2–1.4 × apical width, equal to about 0.75 of II, ventral length in some specimens equal to apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length of midtarsomeres II and III 2.3 and 1.5–1.6 × apical width, respectively. Venter of apical tarsomeres with one or two small spines next to apical margin. Sternum VIII tridentate apically. Length 7.5–9.5 mm. Volsella and penis valve: Figs. 267e, f. Femora black except narrowly red apically; tibiae varying from mostly red (with only narrow dorsal

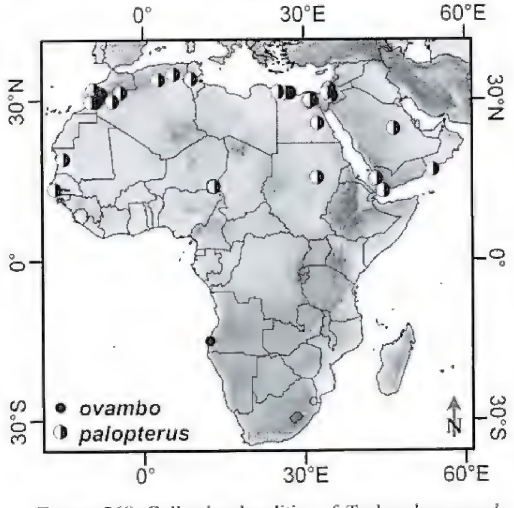


FIGURE 268. Collecting localities of *Tachysphex ovambo* and *palopterus*.

zone dark) to predominantly black (fore- and midtibiae reddish basally and apically, also foretibial inner surface); tarsi red to largely black.

GEOGRAPHIC DISTRIBUTION (Fig. 268).— Known from one locality in southwestern Angola.

RECORDS.— HOLOTYPE: ♀, **ANGOLA**: 10 mi [= 16 km] NE Moçâmedes, now Namibe, 27–29 Feb 1972, [British Museum] Southern African Expedition (BMNH). PARATYPES: same data (1 ♀, 2 ♂; 1 ♀, 5 ♂, BMNH).

Tachysphex palopterus (Dahlbom)

Figures 268, 269.

Tachytes palopterus Dahlbom, 1845:470, ♂ (as *paloptera*, incorrect original termination). Lectotype: ♂, Egypt: no specific locality (NRS), **here designated**, examined.— Kohl, 1885:405 (in checklist of world *Tachytes*).— As *Tachysphex palopterus*: Kohl, 1885:396 (new combination, original description copied); Dalla Torre, 1897:682 (in catalog of world Hymenoptera); de Beaumont, 1940:165 (in revision of Egyptian *Tachysphex*); Honoré, 1942:56 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:162 (in revision of Egyptian *Tachysphex*), 1950a:405 (Algeria), 1955:176 (Morocco; description of ♀); Pulawski, 1964:83 (Egypt, recognition characters), 1971:338 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:11 (Israel); Bohart and Menke, 1976:275 (listed); Guichard, 1980:227 (Oman).

As *Tachysphex nattereri*: Kohl, 1888a:144 (♂ only), corrected to *Tachysphex palopterus* by Pulawski, 1971:323 and 338.

Tachysphex No. 1: de Beaumont, 1940:166 (description of ♀, Egypt). Corrected to *Tachysphex palopterus* by de Beaumont, 1955a:176.

LECTOTYPE SELECTION.— Dahlbom (1845) did not specify the number of specimens on which he based his description of *palopterus*. De Beaumont (1940) examined the only specimen in existence and commented "j'ai examiné le type". This was a valid lectotype selection according to the Third Edition of the Code (1985, Article 74b), but not the first two editions nor the current Fourth Edition (1999, Article 74.6). I therefore designate as lectotype of *palopterus* the specimen so labeled by de Beaumont in 1947 (which I have also examined).

RECOGNITION.— *Tachysphex palopterus*, occurring in North Africa south to Mauritania, Niger, and Sudan, in Israel, and in the Arabian Peninsula, is one of the species in which the labrum is conspicuously convex and protruding from beneath the clypeus and the galea is longer that wide in profile. Also, the scutal punctures average less than one diameter apart, the propodeal side is uniformly microsculptured, the setae adjacent to the hypostomal carina are straight and no longer than one midocellar diameter, appressed on the postocellar area and scutum, and oriented posterad on the propodeal dorsum's apicomedian third or so. In the female, the outer foretibial surface is all setose and the apical depression of tergum V is impunctate and asetose, and in the male the forebasitarsus has 2–6 rake spines and the outer apical spine of foretarsomere II is as long as foretarsomere III or longer.

Like that of *taita*, the female of *palopterus* differs from other species with the above characteristics in having the clypeal lip slightly sinuous or entire rather than incised laterally (Fig. 269a). The two species are nearly identical morphologically, but in *palopterus* the thoracic setae are silvery or with golden tinge on the scutum. In *taita* (known from Kenya and Tanzania), the setae are conspicuously golden on the thoracic dorsum (including the propodeum). Also, the apical depression of tergum V is all asetose in *palopterus*, but setose mesally in many *taita*. In Israel and possibly also in the Sinai Peninsula, *palopterus* overlaps with *persa* Gussakovskij in which the propodeal side is glabrous anteriorly. In the females of *palopterus*, the propodeal side is all setose in most specimens, but glabrous anteriorly in some from Israel, Egypt, Morocco, and Sudan.

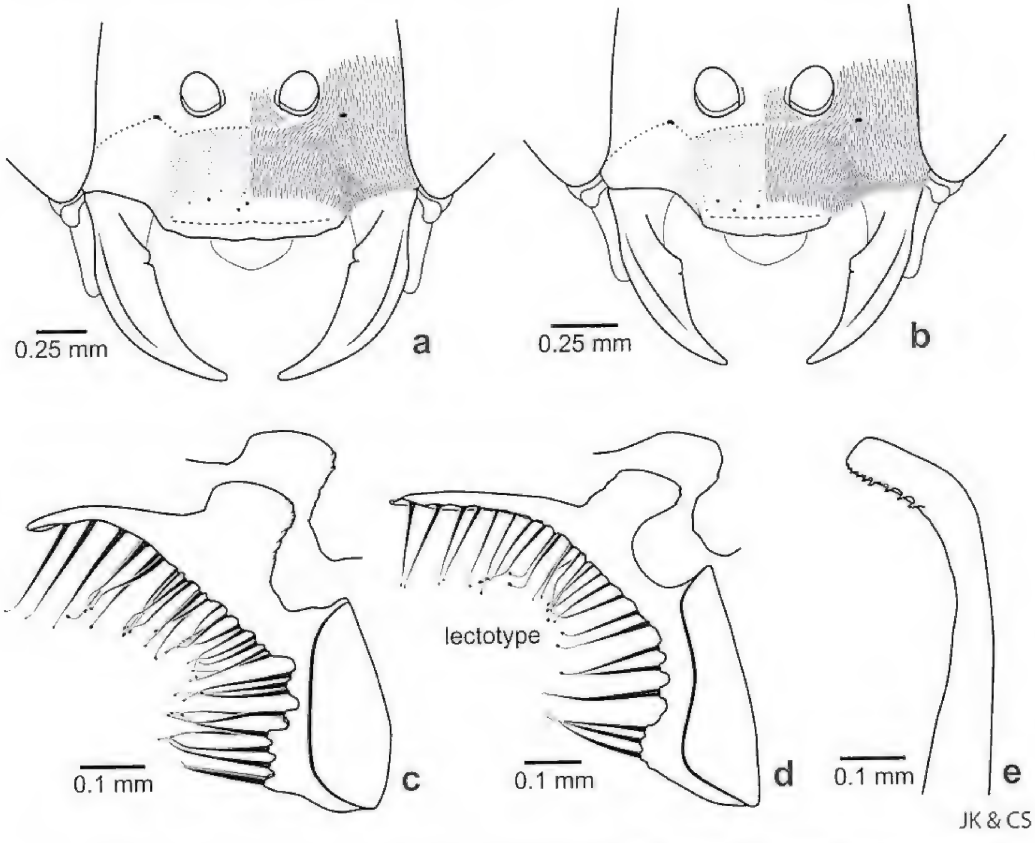


FIGURE 269. *Tachysphex palopterus* (Dahlbom): a – female clypeus and mandible; b – male clypeus and mandible; c – volsella with outline showing variation of the dorsal process; d – volsella of lectotype with outline showing variation of the dorsal process; e – penis valve.

The male can be recognized, in addition to the above, by a wide middle clypeal lobe, with lip corners closer to the respective orbit than to each other (equidistant in some specimens) and the shape of the volsella, with dorsal process either higher than wide and forming an obtuse angle with volsella's apical portion or about as high as wide (Figs. 269c, d). The volsella is similar in some *dissimulatus*, a southern African species.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea longer than wide in profile, densely punctate in most females but sparsely so in those from Morocco, varying from densely to sparsely punctate in male, as long as scape in female, as 0.8–0.9 of scape in male. Scutal punctures ill defined, about one diameter apart. Mesopleuron uniformly microsculptured. Propodeal dorsum and side evenly microsculptured. Hindcoxal dorsum with inner margin carinate.

Setae appressed on postocellar area and scutum; erect and straight on each side of oral fossa next to occipital carina (setal length equal to or slightly less than midocellar diameter); variously oriented on propodeal dorsum but pointing posterad on apicomedian third or so; fully concealing integument on mesopleuron in most females, but not in those from Ghiza and Luxor areas, Egypt, and one from Agadir area, Morocco; propodeal side all setose except glabrous anteriorly in females from same three areas and also Sudan.

Head and thorax black, mandible yellowish red at least mesally, clypeal bevel red in many females (all clypeus red in those from El Riyadh, Saudi Arabia). Thorax black, but largely red in females from El Riyadh, in some with only part of scutum, scutellum, and postscutellum black. Frontal setae silvery in most females, but golden in those from El Riyadh, and in male. Wing membrane nearly hyaline, slightly infumate, or yellowish; costal vein of forewing brownish yellow, subcostal vein brownish yellow to brown. Femora varying from all red to nearly all black; tibiae red or partly black; tarsi red except dark in many Egyptian females. Gaster in female all red or apical two or three segments brown to black; in male segments I and II or I–III red, remainder black. Terga I–IV or I–V silvery fasciate apically in most females, but only terga I–III fasciate in those from El Riyadh, Saudi Arabia, and in males.

♀.— Clypeus (Fig. 269a): bevel longer to shorter than basomedian area; lip free margin arcuate in most specimens but straight or minimally concave in those from Ghiza and Luxor areas, Egypt, emarginate mesally, slightly sinuous or straight laterally. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 2.5–3.1 × apical width. Dorsal foretibial surface with three spines (exceptionally two); outer surface with one or two spines. Forebasitarsus with 6–10 rake spines. Apical spines of hindtarsomere IV almost reaching claw bases. Apical depression of tergum V impunctate, glabrous. Pygidial plate punctate, most punctures several to many diameters apart; interspaces unsculptured, alutaceous in occasional specimens; integument in many specimens slightly concave near midlength (concavity easiest to see in profile). Length 6.5–12.6 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Fig. 269b): bevel about as long as basomedian area, delimited anterolaterally by oblique carina arising from lip corner; lip free margin arcuate to nearly straight, in most specimens emarginate mesally, with well-defined corner; distance between corners 1.2–1.5 × that between corner and orbit (1.0 × in some specimens). Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 1.5–1.9 × apical width. Forefemoral notch microscopically setose in most specimens, asetose in some Egyptian males. Outer margin of forebasitarsus with 2–6 rake spines; outer apical spine of foretarsomere II mostly longer than tarsomere III, as long as tarsomere III in some specimens. Length 5.2–9.5 mm. Volsella and penis valve: Figs. 269c-e.

GEOGRAPHIC DISTRIBUTION (Fig. 269).— North Africa to Gambia, Niger, and Sudan, Israel, Arabian Peninsula.

RECORDS.— **ALGERIA**: Biskra (2 ♀, 2 ♂), Laghouat (de Beaumont, 1950a). **EGYPT**: **Al Fayyum**: Kom Osheim (1 ♀, 2 ♂). **Al Jizah** (= Ghiza): Dahshur (3 ♂), Ghiza (5 ♀, 1 ♂), Saqqara (1 ♂). **Al Qahirah** (= Cairo): Katamia area 40 km E Maadi (1 ♀, MSNT), Maadi (12 ♂). **Al-Uqsur** (= Luxor): near Medinet Habu temple 3 km W Luxor (4 ♀, 8 ♂; 1 ♂, SCHL). **Matruh**: 20 km E Marsa Matruh (1 ♀), 20–25 km W Marsa Matruh (7 ♂; 1 ♂, MSNT), 64 km W Marsa Matruh (6 ♀, 3 ♂; 2 ♀, 1 ♂, MSNT), Solum (de Beaumont, 1940). **No specific locality**: 1 ♂, lectotype of *palopterus*. **GAMBIA**: Banjul (1 ♂, ZMAN). **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973, or as indicated): Bat Yam (1 ♀, 5 ♂), Beersheba (2 ♀, 2 ♂), Bne Braq, Ramat Gan, Revivim, Shizaf Nature Reserve at 30°46.0′N 35°15.4′E (1 ♀; 1 ♀, CSE), Urim. **MAURITANIA**: 153 km NE Nouakchott (2 ♂, MSNT). **MOROCCO**: Agadir (1 ♀), between Asni and Imlil (1 ♀, CSE), Aoulouz 140 km E Agadir (2 ♂; 2 ♂, CSE), Erfoud in Tafilalt oasis (1 ♂), 1 km E Essaouira at 31°30′N 9°44′W (2 ♀, CSE), Marrakech: Oued Tensift (1 ♂), Mhamid in Draa Valley 80 km S Zagora (1 ♀, 3 ♂, CSE), Oulad Teima 30 km E Agadir (2 ♀; 1 ♀, CSE), Tafraout (1 ♀), Tiznit: Sidi Moussa (1 ♀). **NIGER**: **Diffa Region**: 8 km ENE Nguigmi at 14°17.2′N 13°10.1′E (1 ♀), 12 km ENE Nguigmi at 14°18.9′N 13°13.2′E (7 ♀), 11 km NNE Nguigmi at 14°20.8′N 13°07.9′E (1 ♀), 13 km NNE Nguigmi at 14°23.0′N 13°08.0′E (4 ♀), 13 km SW Nguigmi at 14°10.3′N 13°01.3′E (1 ♀). **OMAN**: Felidj Ma'ald (1 ♂, BMNH), Salalah in Dhofar Province (Guichard, 1980). **SAUDI ARABIA**: El Riyadh (8 ♀, 6 ♂). **SUDAN**: Khartum (1 ♀, MSNT). **TUNISIA**: no specific locality (de Beaumont, 1940). **YEMEN**: Al Kadan (1 ♂; 2 ♀, 1 ♂, ZMAN), Al Lahima (2 ♂, ZMAN), Lahj (1 ♀; 2 ♀, ZMAN; 4 ♂, RMNH).

Tachysphex panzeri (Vander Linden)

Figures 270–272.

[N.B. There are more than 200 literature citations of *panzeri* and its synonyms subsequent to the original descriptions, mostly locality records from Europe and North Africa, but only the essential nomenclatural references are provided here. Previous revisionary studies are by de Beaumont, 1936a:192, 1947a:156, Pulawski, 1971:262, and Krombein and Pulawski (1994:12, 63).]

Tachytes panzeri Vander Linden, 1829:22, ♀, ♂ (♀ = *Tachysphex pseudopanzeri*). Syntypes: Spain: no specific locality (lost). Neotype: ♂, Spain: Toledo (RMNH), designated by Pulawski, 1971:262, examined before 1971.— As *Lyrops panzeri*: Casolari and Casolari Moreno, 1980:113 (new combination).— As *Tachysphex panzeri*: Kohl, 1883a:177 (new combination).

Lyrops rufiventris Spinola, 1839:479, ♀. Holotype or syntypes: ♀, France: Corse: no specific locality (not in MSNT, probably lost: see de Beaumont, 1952e:47; not listed by Casolari and Casolari Moreno, 1980), not examined. Synonymized with *Tachytes panzeri* by A. Costa, 1884:246 and 1885:17, and by Pulawski *in* Krombein and Pulawski, 1994:63.— Kohl, 1885a:356 (tentative new synonym of *Tachysphex panzeri*).— As *Larrada rufiventris*: F. Smith, 1856:280 (new combination).— As *Tachytes rufiventris*: A. Costa, 1882b:22 and 34 (new combination); nec Magretti, 1884 (= *Tachysphex argentatus* and *luxuriosus*).— As *Tachysphex rufiventris*: Kohl, 1885a:397 (tentative new combination).— As *Tachysphex panzeri rufiventris*: Pulawski, 1971:270 (new status).

Tachytes oraniensis Lepeletier de Saint Fargeau, 1845:253, ♀, ♂ (as *Oraniensis*, incorrect original capitalization). Syntypes: Algeria: Oran (MNHN), not examined. Synonymized with *Tachysphex panzeri* by Kohl, 1884:368, and by Pulawski *in* Krombein and Pulawski, 1994:63.— As *Tachysphex oraniensis*: Kohl, 1884:368 (new combination).— As *Tachysphex panzeri* var. *oraniensis*: Medina, 1896:107 (new status).— As *Tachysphex panzeri* forme *oraniensis*: de Beaumont, 1955:174 (new status).— As *Tachysphex panzeri oraniensis*: Schulz, 1905:45 (new status).

Tachytes aurifrons Lucas, 1849:246, ♀. Syntypes: Algeria: La Calle, now El Kala (MNHN), not examined. Synonymized with *Tachysphex panzeri* by Kohl, 1884:368 (tentatively) and de Beaumont, 1947c:662, who examined type material.

Tachytes discolor Frivaldszky, 1877:351, ♂. Syntypes: Hungary: Budapest, also Grebenácz in Temes Komitat, now in Timiş District in Romania (lost). Neotype: ♂, Hungary: Budapest-Rákos (TMB), designated by Pulawski *in* Krombein and Pulawski, 1994:63, examined. Synonymized with *Tachysphex panzeri* by Kohl, 1883d:226.— As *Tachysphex panzeri* var. *discolor*: Morice, 1911:104 (new status).

Tachytes pulverosus Radoszkowski, 1886:32, ♀, ♂. Lectotype: ♂, Uzbekistan: Samarkand (KRAKÓW), designated by de Beaumont, 1936b:610 ("qui doit être considéré comme type"), examined before 1971. Synonymized with *Tachysphex panzeri* by Pulawski *in* Krombein and Pulawski, 1994:63.— As *Tachysphex pulverosus*: Kohl *in* Dalla Torre, 1897:684 (new combination, in catalog of world Hymenoptera).— As *Tachysphex panzeri pulverosus*: Pulawski, 1971:274 (new status, in revision of Palearctic *Tachysphex*).

Tachytes ceylonicus Cameron, 1900a:21, ♂ (as *ceylonica*, incorrect original termination). Holotype or syntypes: ♂, Sri Lanka: no specific locality (OXUM), examined in 1974. Synonymized with *Tachysphex panzeri* by Pulawski, 1975:312.

Tachytes aurifrons Cameron, 1900:23, ♀ (actually ♂), junior primary homonym of *Tachytes aurifrons* Lucas, 1849. Lectotype: ♂, Sri Lanka: Trincomalee (BMNH), designated by Pulawski, 1975:312, examined in 1974. Synonymized with *Tachysphex panzeri* by Pulawski, 1975:312.

Tachysphex ablatus Nurse, 1909:516, ♀. Lectotype: ♀, India: Gujarat: Deesa (BMNH), designated by Pulawski, 1975:312, examined in 1974. Synonymized with *Tachysphex panzeri pulverosus* by Pulawski, 1975:312.

Tachysphex panzeri fortunatus de Beaumont, 1968:261, ♀, ♂. Holotype: ♀, Canary Islands: Gran Canaria: Maspalomas (BMNH), examined before 1971. Synonymized with *Tachysphex panzeri* by Pulawski *in* Krombein and Pulawski, 1994:63.

Tachysphex panzeri cyprius Pulawski, 1971:272, ♀, ♂. Holotype: ♀, Cyprus: Limassol (CAS), examined.

Synonymized with *Tachysphex panzeri* by Pulawski *in* Krombein and Pulawski, 1994:63.

Tachysphex panzeri sareptanus Pulawski, 1971:272, ♀, ♂. Holotype: ♀, Russia: Sarepta, now Krasnoarmeysk (ZIN), reexamined in 2006. Synonymized with *Tachysphex panzeri* by Pulawski *in* Krombein and Pulawski, 1994:63.

Recognition.— *Tachysphex panzeri*, occurring in northern third of Africa, in Europe, and in Asia, has the labrum convex and conspicuously protruding beyond the clypeal free margin (Fig. 270e), galea longer than wide in profile (Figs. 270a, b), and the propodeal side evenly microsculptured. It is further characterized by the setae appressed on the postocellar area and straight, about one midocellar diameter long on each side of the oral fossa next to the occipital carina, female tergum V evenly micropunctate and setose (including the apical depression), and presence of a foretarsal rake in the male.

Other species share the above characteristics. Krombein and Pulawski (1994) discussed recognition of *panzeri* from similar Asian species: *conclusus* Nurse, 1903 (India: Gujarat and Rajasthan), *diadelus* Pulawski, 1994 (Sri Lanka), *lucillus* Pulawski, 1971 (Turkmenistan), *noar* Pulawski, 1994 (Sri Lanka), and *tessellatus* Dahlbom, 1845 (Greece, Turkey). The following features help distinguish *panzeri* from similar African species:

(1) the mandibular notch is the usual size, while unusually large in *buyssoni* (Figs. 73c, d);
(2) the free margin of the lateral clypeal lobe is deeply concave, while shallow in *cheops* and *ramses* (compare Figs. 270c, d, and 91a, b);
(3) the free margin of the clypeal lobe, in the female is not incised laterally, while incised in *incertus*, most *mocsaryi*, and in *palopterus*;
(4) the setae of the lower gena are about as long as one midocellar diameter (slightly longer than midocellar diameter in some southern Saharan populations); these setae are longer than one midocellar diameter in *cheops* and in populations of *calidus* from Kenya, Ethiopia, and from West Africa where the two species overlap;
(5) the gaster is red at least basally in the continental African populations but all black in specimens from the Canary Islands, and all black or nearly so in specimens from Oman and United Arab Emirates (also all black in *chephren* and *notogoniaeformis*);
(6) at least terga I–III are silvery fasciate apically (fasciae absent in *aemulus, liriformis*, and *notogoniaeformis*);
(7) the pygidial plate, in the female, is dull, markedly microsculptured between punctures (unsculptured in *mycerinus*, practically unsculptured in *ptah*), and with a well-defined lateral carina (carina lower than average for the genus in *mycerinus*);
(8) the foretibia is densely setose throughout (outer face glabrous or sparsely setose in *sycorax*);
(9) the volsella is distinctive in having a low, mostly rounded dorsal process (Fig. 271), although similar to that of *excavatus* (in which the forefemoral notch is unusually large), of *pulcher*, *sycorax*, and the extralimital *tessellatus*. A similar volsella is also found in many *dissimulatus*, a southern African species, although in most specimens the dorsal process is either truncate apically or not separated from the distal volsellar portion (Fig. 120c). No other character has been found to separate the males of these two species.

Tachysphex panzeri is externally identical to *pseudopanzeri* de Beaumont, 1955 (southern France, Iberian Peninsula, Morocco) whose male, however, can be instantly recognized by a sharply pointed dorsal volsellar process (as in *incertus*). De Beaumont (1955) and Pulawski (1971) thought, probably in error, that the females could be differentiated by their color pattern and silvery tergal fasciae. They assigned to *panzeri* those French and Iberian specimens in which the gaster was red basally and black apically, and to *pseudopanzeri* the females that had the gaster red basally and apically but black preapically (segment IV or III and IV black). They thought that the Moroccan females with an all red gaster were *panzeri* if they had silvery fasciae on terga I–III, and

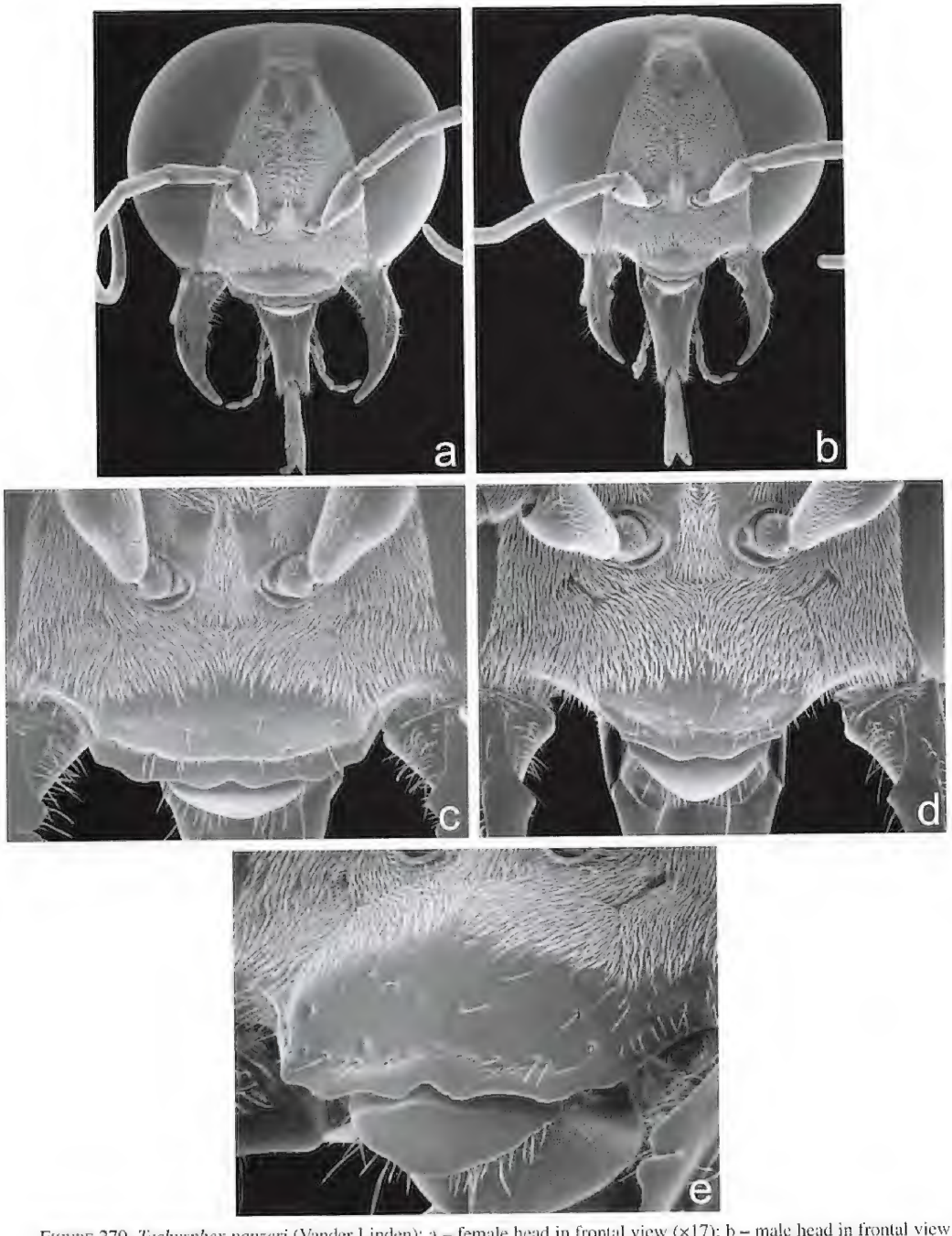


FIGURE 270. *Tachysphex panzeri* (Vander Linden): a – female head in frontal view (×17); b – male head in frontal view (×18); c – female clypeus (×42); d – male clypeus (×48); e – female clypeus and labrum in lateral oblique view (×53).

pseudopanzeri if the fasciae were present on terga I–IV. The color pattern, however, most likely has no value in species discrimination, because females colored as the supposed French and Iberian *pseudopanzeri* also occur in those areas (Romania to Sri Lanka) where males of *pseudopanzeri* have never been collected. Most likely, the true female of *pseudopanzeri* is still unrecognized.

Description.— Labrum convex, markedly protruding from beneath clypeus (Fig. 270e). Galea longer than wide in profile, as long as 1.0–1.2 of scape (Figs. 270a, b). Scutal punctures ill defined, about one diameter or less apart. Mesopleuron dull, microsculptured, impunctate. Propodeal dorsum and side evenly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on frons, postocellar area, scutum, mesopleuron, and midfemoral venter; suberect, about one midocellar diameter long on each side of oral fossa next to occipital carina; variously oriented on propodeal dorsum: admedian setae pointing obliquely anteromesad, or pointing toward midline, or pointing posterad.

Head and thorax black, mandible yellowish red mesally, clypeus black or partly yellowish. Frontal setae silvery in female and smallest males, golden in most males. Wing membrane slightly infumate to nearly hyaline; costal and subcostal veins of forewing ranging from reddish brown and brown, respectively, in European specimens, and from yellowish brown to reddish brown, respectively, in many desert specimens. Femora, tibiae, and gaster ranging from all black to all red (see Variation below). Terga I–III or I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 270c): bevel as long as basomedian area or longer; lip free margin arcuate, emarginate mesally, in most specimens sinuous laterally. Width of postocellar area 0.6–0.9 × length. Dorsal length of flagellomere I 2.4–3.1 × apical width. Dorsal foretibial surface with three spines; outer surface with two to several spines. Forebasitarsus with 7–9 rake spines. Apical spines of hindtarsomere IV almost reaching claw bases. Tergum V finely punctate and setose throughout, including apical depression. Pygidial plate markedly microsculptured, with punctures that average more than one diameter apart. Length 9.0–14.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 270d): bevel as long as basomedian area or shorter, delimited ventrolaterally by obtuse, oblique carina that emerges from lip corner; lip free margin arcuate, shallowly emarginate mesally (emargination vestigial in some specimens), with well-defined corner; distance between corners 0.9–1.1 × distance between corner and orbit. Width of postocellar area 0.6–1.2 × length. Dorsal length of flagellomere I 1.5–2.3 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 4–7 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Length 6.5–10.8 mm. Volsella and penis valve: Fig. 271.

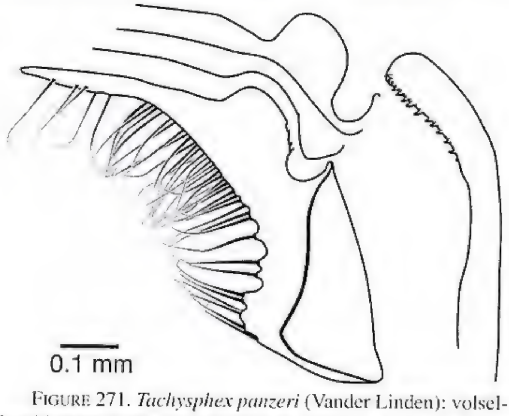


Figure 271. *Tachysphex panzeri* (Vander Linden): volsella with outlines showing individual variation and penis valve.

Variation.— *Tachysphex panzeri* varies considerably over its range, mainly in the size of its gena, in color, and amount of vestiture. Details are presented below:

Gena. The gena is moderately thick in dorsal view in specimens from temperate climates, but thin in specimens from African and Asian deserts, particularly females.

Thoracic vestiture. Vestiture is moderately dense in specimens from temperate climates and

also those from Nigeria (not concealing integument in female), markedly denser in populations from Asian and African deserts (almost totally concealing integument in female).

Propodeal setae. The propodeal side is glabrous anteriorly (along the metapleuron) except entirely setose in many desert populations.

Silvery fasciae of female gaster. Terga I–IV are silvery fasciate apically in most populations, but I–V in those from Burkina Faso (most specimens), Niger, Sinai, Oman, and United Arab Emirates, and only I–III in females from Canary Islands, in many specimens from North Africa (Morocco, Algeria, Tunisia, Egypt) and from Nigeria and Israel, and in one ♀ from Carpentras, France (Pulawski, 1971).

Color of female clypeus. The female clypeus can be: a. all black (most European specimens, Canary Islands), b. the bevel reddish brown (many specimens from southern Europe, Asian Turkey, some from Morocco, Syria, and Iran, all those from Oman and United Arab Emirates), c. the bevel red (many specimens from North Africa, Israel, and Kazakhstan), or d. the bevel or the entire middle clypeal section predominantly yellow (Egypt, Mauritania, Mali, Burkina Faso, Niger, Nigeria, Central Asia, Pakistan, India, Sri Lanka, some specimens from Morocco and Iran).

Color of femora. In the female, the femora can be: a. all black (Netherlands, Poland, Lithuania, Slovakia, Hungary, Oman, United Arab Emirates), b. all black except red apically (France including Corsica, Italy including Sardinia, Spain, Canary Islands, Sinai, Turkey), c. varying from all black to largely red (Romania, Bulgaria, Hoggar Mountains in Algeria, Iran, Central Asia, Sri Lanka), or d. all red or nearly so (Cyprus, Africa, Central Asia, Pakistan, India). In the male, the femora are either all black (Europe, Canary Islands, Syria), or black with red apex (Turkey, some from Cyprus, some from Central Asia and India, those from Sri Lanka), or all red or nearly so (Africa, most males from Cyprus, many from Central Asia, some from India).

Color of tibiae and tarsi. These vary from all black (e.g., many European males) to all red (e.g., Africa, Sinai, India), mostly black but foretibial outer surface red (Sri Lanka), and mostly red but partly darkened (males from Canary Islands). In specimens from Oman, the foretibia is all or largely red, the midtibia partly red (largely so in some specimens), and the hindtibia is black.

Color of gaster. In the female, the gaster can be: a. red basally and black apically (most specimens from Europe and Turkey, Sinai, many from Kazakhstan), b. all red (most specimens from Corsica, Sardinia, Cyprus, southeastern European Russia, Africa, Pakistan, many from Iran), c. red basally and apically, with segments IV and V black or brown (India, Sri Lanka, also some from Romania, Corsica, Sardinia, Cyprus; the females from southwestern Europe and Morocco currently assigned to *pseudopanzeri* may actually belong here), d. all black or with terga I and II reddish posteriorly (Oman, United Arab Emirates), or e. all black (Canary Islands). In the male, the gaster can be: a. all black (Canary Islands, Oman except the specimen from Sohar, United Arab Emirates, many specimens from central Europe between the Netherlands, Lithuania and Hungary, from Crete and Kazakhstan), b. red basally and brown or black apically (most European, many Asian, some North African specimens, also single male from Nigeria; the amount of red increasing toward the south), or c. all red (some specimens from Cyprus, many from North Africa, all those from Mauritania, Senegal, Mali, Niger).

In several of the specimens collected 25–35 km south of Richard Toll, Senegal, the flagellum is black and the thoracic and female frontal setae are silvery, as in other desert populations. In other specimens from that area, the flagellum is partly reddish (especially basally), and the scutal and female frontal setae are golden (slightly to conspicuously so). The flagellum is reddish basally, and the scutal setae are golden in single female from Nigeria. Thoracic setae are also golden in the males from Banjul, Gambia, and one of the two males from Kayar, Senegal.

Recognition of subspecies.— Pulawski (1971) recognized seven subspecies of *panzeri*, but

later (*in* Krombein and Pulawski, 1994) sunk them all into synonymy for the following reasons: 1. morphotypes that qualify for two subspecies are sometimes intermixed within the same population (e.g., two color forms of the Corsican and Sardinian females, see Pulawski, 1971:271), 2. in many cases, variation reflects ecological but not geographic differences, and population separated by an insignificant distance could be assigned to two subspecies, 3. transition from one subspecies to another is clinal (e.g., from *panzeri panzeri* to *panzeri sareptanus*, and from the latter to *panzeri pulverosus*, and many populations are intermediate), and 4. recognition of formal subspecies leads to an unnecessary proliferation of names.

NESTING BEHAVIOR.— Nesting habits *of panzeri* were studied by Fabre (1886) and Deleurance (1946) in France, Grandi (1961) in Italy, and Krombein in Sri Lanka (*in* Krombein and Pulawski, 1994). Their observations are summarized below.

The female excavates her nest with forelegs, but she can also evacuate small lumps of soils or sand grains with her mandibles while walking backward. The burrow, 4–9 cm long, penetrates the ground at an oblique angle (30° according to Krombein), either straight or bending, and ends in a single cell that is 3 cm long. After completion of the nest, the female closes the entrance with soil, walks around, performs an orientation flight, and goes hunting. The prey consists of adult or nymphal acridids that are held by the wasp's mandibles during transportation. They are either carried on foot (Krombein), in a series of hopping flights (Deleurance), or in a continuous flight (Grandi), apparently depending on the prey's size and weight. Arriving to the nest, the female drops the prey, opens the nest's entrance and goes inside, then turns around, reappears headfirst, grabs the prey with her mandibles, and drags it inside. Either one or two prey specimens are stored per cell, laid on their back or partly on a side, with their heads toward the cell's end. The egg is placed transversely on the acridid body, just behind the forecoxae, with the cephalic end near the articulation membrane of either the right or the left coxa, and the cocoon is incrusted with sand grains. A variety of prey species have been recorded: *Dociostaurus genei* (Ocskay) by Bernard (1934), *Myrmeleotettix ? maculatus* (Thunberg) by Goebel (1937, as *Gomphocerus*), *Calliptamus italicus* (Linnaeus) by Grandi (1961), *Calliptamus barbarus* (Costa) by Asís and Jiménez (1988), *Schistocerca gregaria* (Forskål) by de Beaumont (1956a), *Sphingonotus rubescens* (Walker) by Gayubo (1986b), *Aulacobothrus luteipes* Walker and *Trilophidia annulata* (Thunberg) by Krombein (1988), while Deleurance (1946) listed *Acrotylus insubricus* (Scopoli), *Dociostaurus genei* (Ocskay), *Dociostaurus maroccanus* (Thunberg), *Euchorthippus pulvinatus* (Fischer-Waldheim), *Oedipoda caerulescens* (Linnaeus), and *Sphingonotus coerulans* (Linnaeus). Kazenas (2001) recorded a nymphal acridid about 10 mm long.

GEOGRAPHIC DISTRIBUTION (Fig. 272).— Africa between the Mediterranean coast and southern Sahara (south to about 12° of northern latitude), Europe north to North Sea in Holland and to Baltic Sea in Poland and Lithuania (unknown from Switzerland and British Isles), Asia (including Arabian Peninsula) east to Kazakhstan, Sri Lanka, and Mongolia (Tsuneki, 1972). Records of *panzeri* from Ethiopia

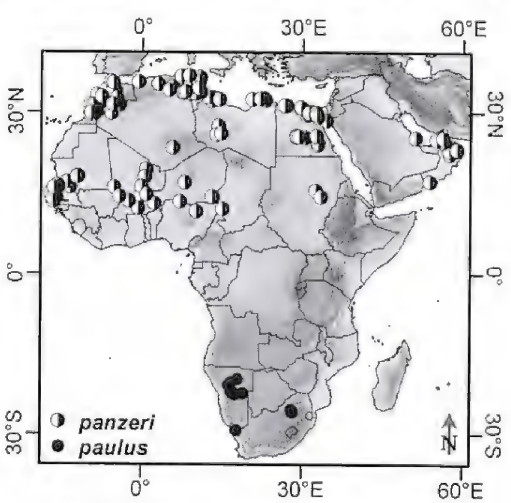


FIGURE 272. Collecting localities of *Tachysphex panzeri* (African and Arabian localities only) and *paulus*.

(Guiglia, 1939b), southern Africa (Bischoff, 1913; Arnold, 1923, 1924, 1947), and Thailand (Krombein and Pulawski, 1994) are all misidentifications.

Records (only African and Arabian localities are recorded; literature data prior to de Beaumont, 1947, are not included as reliable recognition features were not known; see Pulawski, 1971, and subsequent faunal papers for records from Europe and Palearctic Asia, and Krombein and Pulawski, 1994, for records from Pakistan, India, and Sri Lanka).— **ALGERIA**: Biskra (Pulawski, 1971), El Kala (Lucas, 1849), Hammam Lif (1 ♀, NHMW), Idjef Mélène in Hoggar Mts. (1 ♀, 1 ♂), Oran (Lepeletier de Saint Fargeau, 1845), Oued el Kebir near Jijeli (also spelled Djidjeli) ca 80 km NW Constantine (1 ♂, MSNT), Oued Ténéouène in Tassili des Ajjer (de Beaumont, 1958). **BURKINA FASO**: 1 km NE Gorom Gorom at 14°27.3′N 0°13.1′W (4 ♀, 1 ♂), 99 km E Ouagadougou at 12°14.9′N 0°42.3′W (1 ♀), 4 km NW Ouahigouya at 13°37.0′N 2°27.6′W (2 ♀). **CHAD**: N'Djamena (1 ♀, 1 ♂; 2 ♀, 1 ♂, ZMAN). **EGYPT**: **Al Fayyum**: Kom Osheim (7 ♂; 1 ♀, 1 ♂, MSNT). **Al Iskanderiyah** (= Alexandria): 50 km SSW Alexandria (1 ♀, MSNT), Amrye (de Beaumont, 1966). **Al Jizah** (= Ghiza): Abu Rawash (1 ♂), Dahshur (1 ♀), Ghiza (1 ♀, 3 ♂), Saqqara (1 ♀). **Al Qahirah** (= Cairo): Maadi (2 ♀, 12 ♂). **Al-Uqsur** (= Luxor): near Medinet Habu temple 3 km W Luxor (2 ♂; 1 ♂, SCHL). **Al-Wadi al-Jadid**: Dakhla oasis: Ewina (2 ♂, ZMAN), Ezeb el Kassr (1 ♂, ZMAN), Kharga oasis: El Kharga (Pulawski, 1971), Mut (1 ♀, 1 ♂, ZMAN), Rashda (1 ♂, ZMAN), Sheik Waley (1 ♂, ZMAN), Tineida (Pulawski, 1971). **As Suways** (= Suez): 10 km N Suez at 30°03′N 32°34′E (1 ♀, 1 ♂, CSE). **Aswan**: Aswan: west bank (4 ♂), near Kom Ombo temple (1 ♂). **Matruh**: 20–25 km W Marsa Matruh (3 ♀, 6 ♂; 3 ♀, 4 ♂, MSNT), 64 km W Marsa Matruh (2 ♀, 2 ♂; 3 ♀, 4 ♂, MSNT). **Sina** (= Sinai): Wadi Garandal 30 km NW Abu Zenima (1 ♀), Wadi Ghaib 50 km SSE Nuweiba (1 ♂, MSNT), Wadi Sudr 50 air km SE Suez (1 ♂). **GAMBIA**: Banjul (1 ♂; 1 ♂, KMG; 1 ♂, ZMAN). **LIBYA** (de Beaumont, 1956a and 1960b, or as indicated): **Cyrenaica**: Bersis, Rommel's Pool 10 km NE Benghazi, Tmimi, Wadi Derna. **Fezzan**: Brak, Mourzouk, Oum el Araneb. **Tripolitania**: Ain Zara, Aziza District (2 ♀), Cussabat, Garian, Sabratha, 2 km E Wadi Caam. **MALI**: Adrar (2 ♂, KMG), Aguelhok (1 ♀, KMG), Anefis (1 ♂, KMG), Gao (2 ♀, KMG), 10 km S Mopti (2 ♀; 1 ♀, MS). **MAURITANIA**: Kaédi (1 ♂, FB), Lake Aleg 30 km W Aleg (4 ♂; 1 ♂, MSNT), Oued Henné ca 50 air km NE Moudjéria (1 ♀, 1 ♂), Tamouret Naaj ca 30 air km NE Moudjéria (1 ♂). **MOROCCO** (de Beaumont, 1955, or as indicated): Agadir (1 ♀, 2 ♂), Amismiz, Aoulouz (1 ♂, OÖLM), Asni, Beni Mellal (1 ♂), Casablanca (1 ♀, SCHL), Casablanca: Ain Diab (1 ♂), El Jadida at 33°15′N 8°30′W (1 ♂), Erfoud in Tafilalt Province (Pulawski, 1971), 1 km E Essaouira at 31°30′N 9°44′W (1 ♂, CSE), Fès, Ifrane, Ixmoart (Pulawski, 1971), Kenitra (1 ♂, SCHL), Kenitra: Mehdia (1 ♀, 1 ♂), E Kenitra (2 ♂), Marrakech, Meknès (1 ♂), Midelt, Oued Adoudou, Oued Massa 40 km S Agadir (1 ♀, CSE), Safi (1 ♀, 1 ♂, SCHL), Settat (1 ♀, FSAG), Tafraout, Tanger (1 ♂, SCHL), E Taroudant (1 ♂, CSE), Tetouan (Pulawski, 1971), Timhedite in High Atlas (Pulawski, 1971), Tinerhir, Tiznit: Oued Massa (1 ♀, 2 ♂), 30 km NW Zagora in Draa Valley (1 ♀, 1 ♂, CSE), 80 km S Zagora in Draa Valley (1 ♂, CSE). **NIGER**: **Agadez Region**: 5 km N Agadez at 17°01.2′N 8°00.7′E (1 ♂). **Diffa Region**: 12 km ENE Nguigmi at 14°18.9′N 13°13.2′E (1 ♀), 13 km NNE Nguigmi at 14°23.0′N 13°08.0′E (1 ♂). **Tillabéri Region**: 11 km N Ayorou at 14°49.3′N 0°52.2′E (2 ♂), Say (1 ♂, KMG), near Zinder (1 ♂, BMNH). **NIGERIA**: Azare at 11°40′N 10°08′E (1 ♀, 2 ♂, BMNH). **OMAN**: Adam (1 ♂, KMG), Al Mazara at 23°05.2′N 58°51.6′E (1 ♂), Hail al Ghaf at 23°09.7′N 58°55.5′E (2 ♂), Muscat: Seeb (1 ♂, KMG), Rostaq (1 ♂, KMG), Samail Gap (1 ♂, KMG), Sohar (1 ♂, KMG), Wadi Ghul near Nizwa at 22°53.0′N 57°31.2′E (7 ♀, 10 ♂), Wadi Quryat (1 ♂, KMG). **Dhofar**: Ayun Pools (3 ♂, KMG), km 48 of S-N road (1 ♂, KMG). **QATAR**: Al Shahaniyeh (1 ♂, KMG). **SAUDI ARABIA**: Abyan (1 ♂, KMG), Mahail (1 ♂, KMG). **SENEGAL**: Kaolack (1 ♂, FB), Kayar (1 ♂, FB; 2 ♂, MSNT), Ndangane (3 ♂, FB), Richard Toll (3 ♂), 25–35 km S Richard Toll (3 ♀; 20 ♀, 2 ♂, ZMAN), Rosso (1 ♀, MSNT), Saint-Louis (1 ♂, FB). **SUDAN**: Khartum (1 ♀, ZMAN), Wadi Medani (Pulawski, 1971). **TUNISIA**: Djerba (1 ♂), Djerba: N Mezraia (1 ♂, CSE), 5 km W Douz at 33°29′N 8°59′E (1 ♀, CSE), 17 km N Gabès (1 ♂, CSE), 60 km W Gabes (1 ♂, MS), Gafsa (1 ♂, MS), Hammamet (1 ♀, 1 ♂, CSE), Kasserine at 35°14′N 8°59′E (1 ♂, CSE), Kebili (1 ♀, SCHL), Korba (1 ♂, FSAG), 10 km SE Matmata at 33°30′N 10°01′E (2 ♂, CSE), 3 km SW Matmata (1 ♀, CSE), 12 km W Matmata at 33°32′N 9°50′E (1 ♂, CSE), Monastir 15 km S Sousse (1 ♀, CSE), Nefta (1 ♀, MS), 15 km W Nefta at 33°50′N 7°43′E (3 ♀, 3 ♂, CSE), 30 km SW Sfax (1 ♂, MS), 3 km E Tabarka (3 ♀, CSE), Tozeur (Pulawski, 1971). **UNITED ARAB EMIRATES**: Fagsha (1 ♂, KMG), Hatta (1 ♀, 2 ♂, KMG), Jebel Ali (2 ♂, KMG), Khor Fakkan (1 ♂, KMG).

***Tachysphex paulus* Pulawski, sp. nov.**
Figures 272–274.

Derivation of name.— *Paulus*, Latin for small, little; with reference to this wasp's body size.

Recognition.— *Tachysphex paulus* is one of many species in which the labrum is flat and the hindwing crossvein cu-a vertical (or the anal end is closer to the wing base than the cubital end). It has a black gaster and red tibiae, and the scutal setae are appressed.

The female of *paulus* has distinctive tarsi: tarsomeres V with 1–3 minute spines near midlength of each lateral margin (Fig. 273e), venter with a preapical group of such spines, and apicoventral margin convex (Fig. 273e). Several species are similar, but in *paulus* tarsomeres IV are slightly longer than apically wide, with the dorsoapical emargination acutely angulate (Fig. 273c). In addition, the labrum and clypeal lip are emarginate mesally (Fig. 273a).

In the male of *paulus*, the clypeal lip is roundly prominent to obtusely pointed mesally, with a well-defined corner (Fig. 273b), flagellomere I of the usual length (dorsal length 1.4–1.6 × apical width), the forebasitarsus without preapical rake spines, and sternal setae are appressed. Several other species are similar, but they differ by their unusual features that are lacking in *paulus*: in *bipustulosus*, the supraantennal swelling is conspicuously enlarged (Figs. 58c-e); in *hippolyta*, the lateral margins of apical tarsomeres are expanded (Figs. 184e, f); in *harpax*, the setae are short and thickened on the labrum free margin (Fig. 178c); in *saevus*, the wings are yellow (rather than slightly infumate), and the forefemoral posteroventral surface is sparsely punctate. Unlike *ovambo*, the mesopleural punctures of *paulus* are ill defined; unlike *gessianus*, the clypeal lobe is not elongate (midlength about equal to distance between lip corners rather than 1.2 × that distance); and unlike *mkomazi*, the inner mandibular margin is evenly curved distad of tooth (rather than emarginate), and the galea is evenly, sparsely punctate (rather than with sharply delimited, densely punctate area).

Description.— Scutal punctures well defined, averaging 1–2 diameters apart on disk; interspaces dull to shiny. Mesopleuron dull, markedly microsculptured, with ill-defined punctures that are about 1–2 diameters apart below scrobe. Propodeal dorsum rugose or irregularly ridged; side varying from finely ridged to not ridged (and then punctate). Hindcoxal dorsum with inner margin carinate basally.

Setae subappressed on each side of oral fossa next to occipital carina (about as long as midocellar diameter); suberect on postocellar area (no longer than one midocellar diameter); appressed on scutum and midfemoral venter; suberect, inclined posterad on propodeal dorsum.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate; costal vein of forewing light brown, subcostal vein dark brown. Fore- and midfemora black except red apically, hindfemur red except black basally in most specimens but black except narrowly red apically in South African males; tibiae red; tarsi red except female mid- and hindtarsomeres I–IV nearly black. Gaster black. Terga I–III silvery fasciate apically.

♀.— Labrum emarginate. Clypeus (Fig. 273a): bevel as long as basomedian area or shorter; lip free margin arcuate, emarginate mesally, with one or two lateral incisions on each side. Width of postocellar area 1.0–1.1 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with 10–12 rake spines. Tarsomeres IV slightly longer than wide, with acutely angulate dorsoapical emargination (Fig. 273c). Apical tarsomeres with 1–3 (mostly two) spines near midlength of each lateral margin (Fig. 273e); venter with preapical group of small spines; apicoventral margin convex (Fig. 273e). Outer claws of mid- and hindtarsi minimally shorter and thinner than inner claws (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that average several diameters apart; interspaces unsculptured. Length 7.5–9.1 mm.

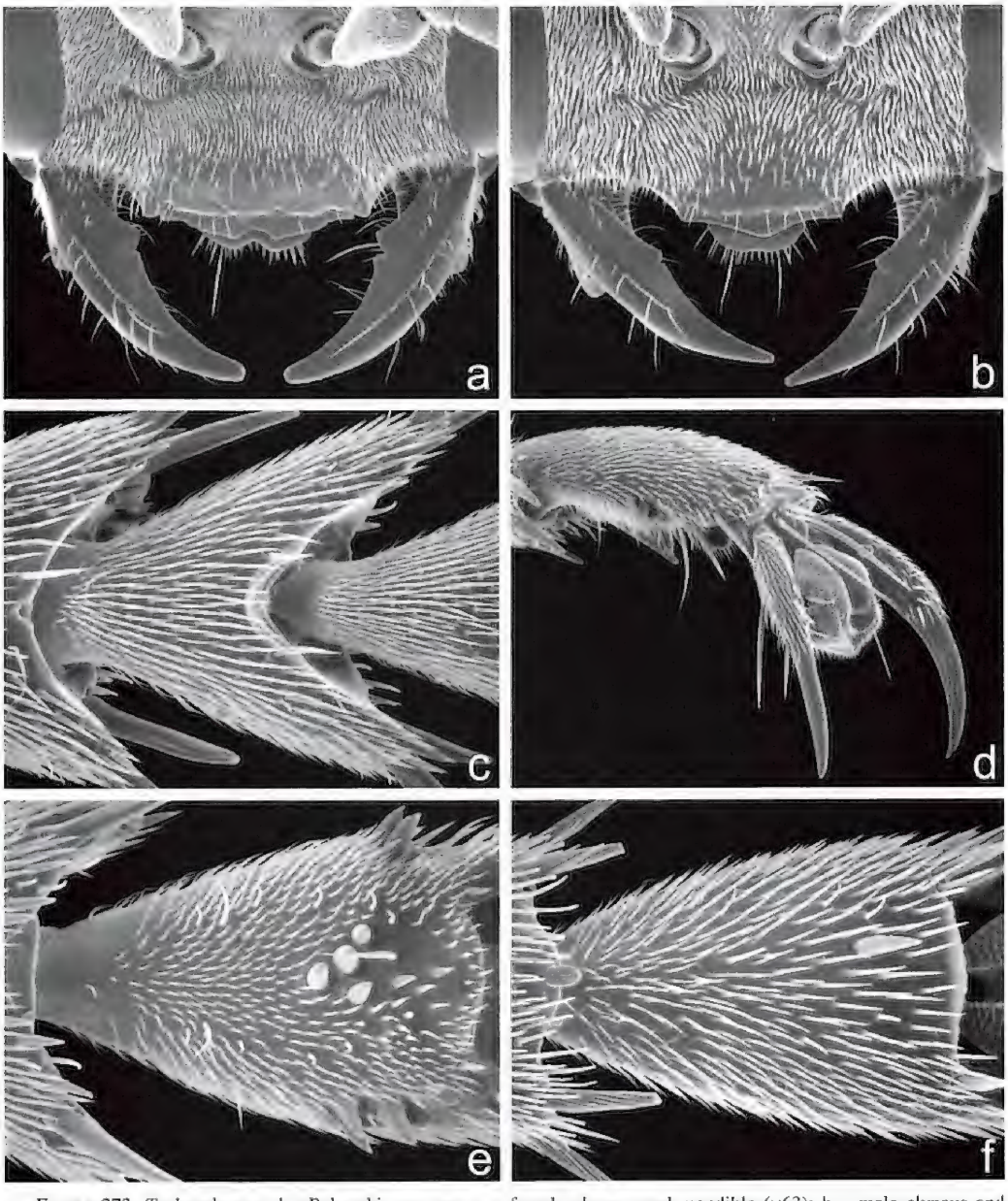


FIGURE 273. *Tachysphex paulus* Pulawski, sp. nov.: a – female clypeus and mandible (×63); b – male clypeus and mandible (×44); c – female hindtarsomere IV dorsally (×216); d – female hindtarsomere V and claws in oblique lateral view (×111); e – female hindtarsomere V ventrally (×252); f – male hindtarsomere V ventrally (×300).

♂.— Mandible: trimmal carina with tooth, with or without cleft. Clypeus (Fig. 273b): bevel unsharply delimited but about as long as basomedian area; lip free margin roundly prominent to obtusely pointed mesally, with well-defined corner; distance between corners 1.1–1.3 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.4–1.6 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus

without preapical rake spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Venters of tarsomeres V each with one preapical spine (Fig. 273f). Sternum VIII with variously shaped apical margin: mostly with median point, but nearly straight in some specimens, or median point incised. Length 6.6–8.2 mm. Volsella and penis valve: Fig. 274.

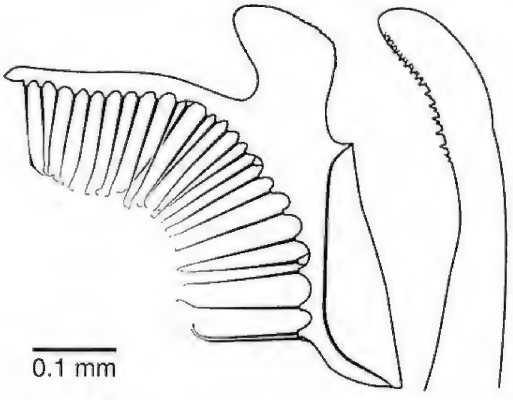


FIGURE 274. *Tachysphex paulus* Pulawski, sp. nov.: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 272).— Namibia, South Africa.

RECORDS.— HOLOTYPE: ♀, **NAMIBIA: Otjiwarongo District**: 18 km NE Kalkfeld at 20°45'S 16°16'E, 22 Feb 1996, WJP (CAS). PARATYPES: **NAMIBIA: Gobabis District**: Okahoa Farm 10 km N Gobabis, 16 Dec 1933, J. Ogilvie (1 ♀, BMNH). **Grootfontein District**: Meteorite, 15 Jan 1993, J. Gusenleitner (2 ♂, JG) and MS (1 ♀, 1 ♂, MS). **Okahandja District**: Leeu River 9 km W Okahandja, 13 Feb 1996, WJP (1 ♂); Okahandja, 2–4 Feb 1972, [British Museum] Southern African Expedition (1 ♂, BMNH); 27 km S Okahandja, 18 Feb 1990, MS (1 ♂, MS); Waldau River 17 km W Okahandja, 19 Feb 1990, MS (4 ♂; 2 ♂, MS), 13–14 Feb 1996, WJP (3 ♀, 6 ♂). **Otjiwarongo District**: 18 km NE Kalkfeld, 22 Feb 1996, WJP (3 ♀, 2 ♂); 25 km NE Kalkfeld, 27 Feb 1996, WJP (5 ♂); 20 km N Otjiwarongo, 13 Mar 1990, MS (2 ♂, MS); 44 km SW Otjiwarongo, 4 Mar 1996, WJP (3 ♂). **Windhoek District**: 36 km E Windhoek, 16 Feb 1990, WJP (1 ♂). **SOUTH AFRICA**: **Gauteng**: Pretoria: Botanical Garden, 7–8 Jan 1996, WJP (1 ♂); Rietvlei (= van Riebeck) Nature Reserve at 25°52′S 28°16′E, 5 Jan 1996, WJP (12 ♂); Tswaing (as Soutpan) at 25°24′S 28°06′E, 14 Dec 1982, CDE (2 ♀, PPRI). **Northern Cape Province**: Steinkopf, 21 Nov 1990, R. Miller and L. Stange (1 ♂, FSCA).

Tachysphex pentheri Cameron

Figures 275–279.

Tachysphex pentheri Cameron, 1905:212, ♂, actually ♀ (as *Pentheri*, incorrect original capitalization). Holotype or syntypes: ♀, South Africa: Eastern Cape Province: Grahamstown (AMG according to original description, now TMP), **here designated as lectotype**, examined.— Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).— As *Tachysphex panzeri* var. *pentheri*: Arnold, 1923:175 (new status, listed), 176 (original description copied), 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex panzeri pentheri*: Bohart and Menke, 1976:275 (new status, listed); Gess, 1981:20 (South Africa, nesting in friable soils).

Tachysphex panzeri var. *nanus* Arnold, 1924:71, ♀, ♂. Lectotype: ♂, South Africa: Eastern Cape Province: Willowmore (TMP), **here designated**, examined. **New synonym**.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex panzeri nanus*: Bohart and Menke, 1976:275 (new status; listed).

As *Tachysphex panzeri* var. *caliban*: Arnold, 1923:169, ♀ only, **present correction**.

Tachysphex panzeri var. *zavattarii* Guiglia, 1939b:74, ♀ (as *Zavattarii*, incorrect original capitalization). Holotype: ♀, Ethiopia: Sidamo: Negele (as Neghelli) in Borana area (GENOVA), examined. **New synonym**.— As *Tachysphex panzeri zavattarii*: Bohart and Menke, 1976:275 (new status; listed).

INTERPRETATION OF SPECIES NAME.— The holotype or the only surviving syntype of *pentheri* is a female, and not a male as stated in Cameron's (1905) original description. It lacks the head now, but its identity can be established based on the scutal punctation, propodeal sculpture and pilosity, shape of foretarsomeres I and II, and color (in particular, the apical half of the clypeus and the labrum were yellow according to Cameron, as it is the case in most specimens). This combination

of characters is found in no other species occurring near Grahamstown, South Africa, the type locality.

Recognition.— *Tachysphex pentheri*, one of the commonest sub-Saharan species, has a labrum convex and protruding beyond the clypeal free margin, an elongate galea (length equal to 0.9–1.0 of scape), propodeal dorsum all setose, with setae diverging obliquely anterad from the midline, the propodeal side all ridged (only anteriorly in some specimens), and the upper metapleural pit oblong. In addition, scutal punctures are well defined (interspaces unsculptured or microsculptured); setae are straight on the head, on the postocellar area appressed and no longer than one midocellar diameter.

The female differs from other such species except *montivagus* in having foretarsomeres I and II not broadened (outer margin not expanding over rake spine bases) and a relatively long clypeus (Fig. 275a): the clypeal midlength is about 0.75 × distance between lobe corners (about 0.65 or less in most other species). Subsidiary recognition features include: dorsal length of flagellomere I at most 2.8 × apical width, width of postocellar area 0.7–1.0 × length. Unlike *montivagus*, the mid- and hindtibiae of *pentheri* are red rather than black (only a part of the midtibia is red in the darkest specimens) and the pygidial plate is unsculptured and shiny between punctures (rather than dull, microsculptured).

The male of *pentheri* differs from similar species by: well-defined lateral margin of the clypeal lip (Fig. 275b); lip corners, in the vast majority of specimens, closer to each other than to the adjacent orbit; sterna V and VI each with erect, subbasal fringe of agglutinated setae (Figs. 276a-f),

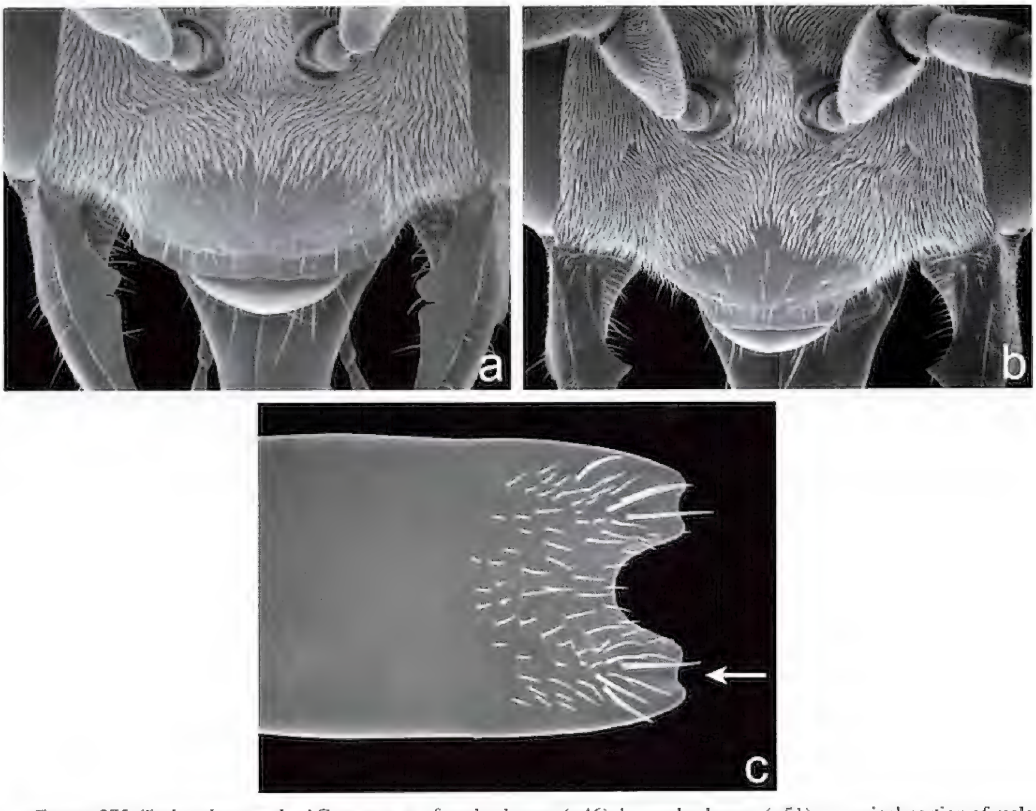


Figure 275. *Tachysphex pentheri* Cameron: a – female clypeus (×46); b – male clypeus (×51); c – apical portion of male sternum VIII (×180).

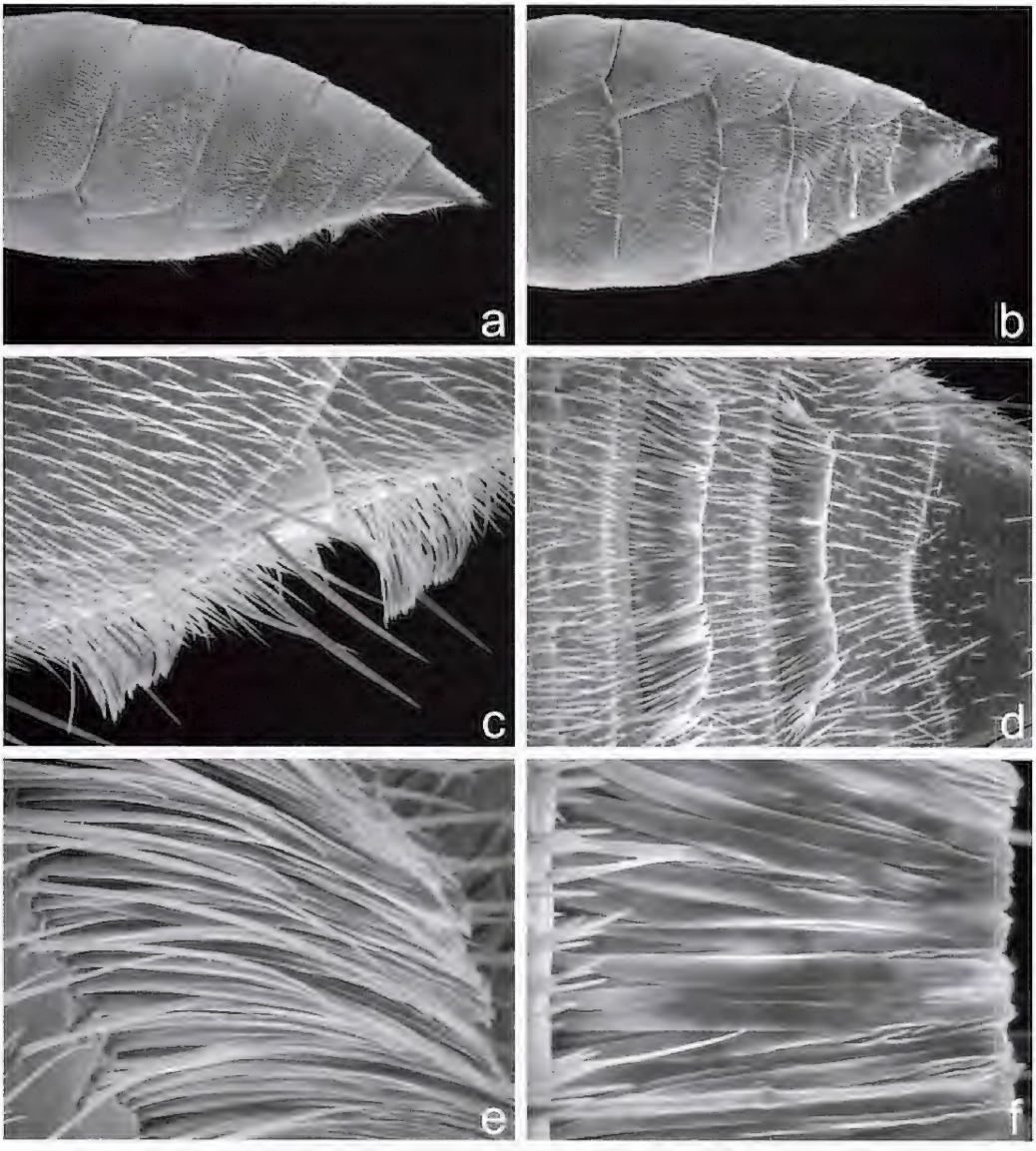


FIGURE 276. *Tachysphex pentheri* Cameron: a – gastral segments II–VII of male in lateral view (×30); b – gastral segments II–VII of male in ventral oblique view (×30); c – sternal fringes of male in lateral view (×180); d – sternal fringes of male in ventral view (×120); e – sternal fringe of male in lateral oblique view (×720); f – sternal fringe of male in flat view (×720).

although the fringes are visible only when the segments are fully extended; and sternum VIII deeply emarginate, with each of its apical prongs, in most specimens, incised apically (Fig. 275c), although the incision may be reduced on one or both sides.

JUSTIFICATION OF NEW SYNONYMY.— Arnold could not recognize *Tachysphex pentheri* and did not realize that it was identical to his *nanus*. The types of these two species are conspecific, as is that of *zavattarii*. All three names are therefore synonyms.

DESCRIPTION (see also Dimorphic Males below).— Labrum convex, markedly protruding from

beneath clypeus. Galea aciculate, sparsely punctate, as long as 0.9–1.0 of scape. Scutal punctures well defined, about one diameter apart in most specimens, up to two or three diameters apart in some (interspaces shiny, microsculptured to unsculptured). Mesopleural punctures minute, superficial, about 1–2 diameters apart. Propodeal dorsum, in some specimens, longitudinally ridged (except laterally), but ridges more or less reduced in most and absent in some; side ridged in most specimens, but with only traces of ridges (next to anterior margin) in occasional males from Namibia and South Africa; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate (except apically), carina not expanded.

Setae appressed on postocellar area; about one midocellar diameter long on each side of oral fossa next to occipital carina; appressed or nearly so on scutum and no longer than one midocellar diameter in most specimens, but suberect, about 1.5 × midocellar diameter long in many specimens from Namibia and western South Africa; on propodeal dorsum diverging obliquely anterad from midline, but pointing laterad on sides; practically appressed on midfemoral venter.

Head and thorax black, mandible red or yellowish (except apically); clypeal bevel, lip, and labrum pale yellow or partly reddish, but partly black in females from Okahandja and Okaukuejo, Namibia, and all black in some males from Okaukuejo. Frontal setae silvery in both sexes, but golden in some males from Namibia and western South Africa. Wing membrane nearly hyaline; costal vein of forewing reddish brown, subcostal vein brown. Femora, tibiae, and tarsi red in most specimens but femora all or largely and tibiae largely black in some (e.g., femora largely black in specimens from Oman; femora, part of midtibia and hindtibia black in single female from Karen, Kenya; femora and hindtibial venter black in specimens from Okaukuejo). Gaster red basally and black apically in most specimens, but all red in some and all black in others (specimens with black gastral apex and those with all red gaster occur together and intergrade in many localities). Terga I–IV in female, I–V or I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 275a): bevel longer than basomedian area; lip either biarcuate or broadly, shallowly emarginate mesally, incised or not incised laterally. Width of postocellar area 0.7–1.0 × length. Dorsal length of flagellomere I 2.2–2.8 × apical width, up to 3.2 × in many specimens from Namibia. Dorsal foretibial surface with two spines; outer surface with one spine near midlength. Forebasitarsus with 6–8 rake spines. Apical depression of tergum V microsculptured and setose (at least sparsely so). Pygidial plate with punctures that average many diameters apart; interspaces unsculptured. Length 5.9–10.2 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 275b): bevel about as long as basomedian area, markedly longer in some specimens; lip free margin slightly arcuate to shallowly concave, with well-defined corner and lateral margin; distance between corners 0.8–1.1 × distance between corner and orbit. Width of postocellar area 0.8–1.1 × length. Dorsal length of flagellomere I 1.7–2.2 × apical width. Forefemoral notch asetose, absent in some specimens (see Dimorphic Males below). Outer margin of forebasitarsus with 4–6 rake spines (with 2–4 spines in specimens with nonemarginate forefemur); outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Tergum VII: punctures varying from less than one diameter to about 1–2 diameters apart. Sterna V and VI (except laterally) each with subbasal, erect fringe of agglutinated setae (Figs. 276a-f), fringes visible only when sterna are fully extended; shallowly concave between fringe and hindmargin. Sternum VIII with well-defined apical emargination, each lateral prong incised apically (Fig. 275c), but one or both incisions absent in occasional specimens. Length 5.0–9.2 mm. Volsella and penis valve: Figs. 277a–c; venter of penis valve in most specimens angulate between basal (smooth) and apical (dentate) portions (Fig. 277b), but angle reduced in specimens from Oman and most from Namib Desert (Fig. 277c).

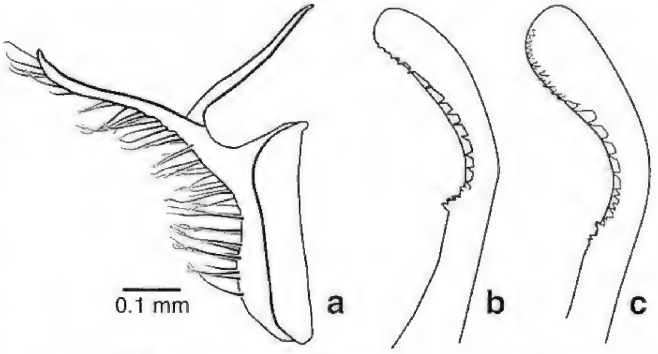


FIGURE 277. *Tachysphex pentheri* Cameron: a – volsella, b – penis valve of a specimen from Namibia; c – penis valve of a specimen from Oman.

DIMORPHIC MALES AND THEIR STATUS.— The male forefemur is emarginate basally in the vast majority of populations, but entire in many specimens from the Namib and Karoo deserts, with no known intermediates. I have not noticed any other constant differences between these two phena. They are largely allopatric, but mixed populations were found together in at least nine localities (Namibia: 30 km E Karasburg, Karas Mountains, Karibib, 15 km E Karibib, Swakopmund; and South Africa: Knersvlakte, 5 km S Lambert's Bay, Langberg, and Swartrivier 7 km NW Prince Albert; specimens collected by H. Brauns in the early XXth century and labeled Willowmore may have originated from different sites). The females cannot be easily associated with one or the other male form in the transition areas: essentially, their scutal setae are fully appressed or nearly so in the main form (male femur emarginate), whereas nearly erect in the females of the non-emarginate male form. Some South African females associated with the usual males, however, have the setae nearly erect, and some females associated with the non-emarginate males have the setae subappressed.

The nonemarginate male femur, in *Tachysphex* in general, may be a species group characteristic (*geniculatus* and its relatives), a species character (e.g., *zambius*), or just individual variation (*brevipennis* and *scopa*). The two forms considered are most likely individual forms of one species, overlapping in some localities. In contrast, the emarginate and nonemarginate forms of the Malagasy *excisus* are sympatric.

PREY.— Several females from Lesotho, Namibia, and South Africa are pinned with their prey, all nymphal acridids (det. F.W. Gess).

FLORAL RECORD.— Namibian specimens were collected on flowers of *Psilocaulon glareosum* (Berger) Dinter and Schwantes (Aizoaceae), *Welwitschia mirabilis* J.D. Hooker, *Galenia* sp. (Aizoaceae), *Limeum sulcatum* (Klotsch) Hutch. (Molluginaceae), *Zygophyllum cylindrifolium* Schinz, and *Z. simplex* Linnaeus (Zygophyllaceae), as recorded by F.W. and S.K. Gess, the collectors.

GEOGRAPHIC DISTRIBUTION (Figs. 278, 279).— Senegal to Yemen and Oman, south to Cape of Good Hope.

RECORDS (the ♂ symbol refers only to males with emarginate forefemur, an *n* instead of sex symbol indicates males with nonemarginate forefemur).— **ANGOLA**: Bruco (1 ♀, 2 ♂, BMNH), Cachoeiras 20 mi SW Gabela (1 ♂, BMNH), 8 mi NE Cacula (1 ♀, BMNH), Chibemba (1 ♂, BMNH), Folgares SE 1415Cc [= 14°45′–15°00′S 15°00′–15°15′E] (1 ♂, NMN), 12 mi SW Luimbala (1 ♂, BMNH), 5 mi NE Negola (2 ♂, BMNH), Rocadas at Cunene River (1 ♀, BMNH). **BOTSWANA**: 1.5 km E Cheleka in Gemsbok National Park (1 ♀), Kuke Pan (3 ♀, 1 ♂, TMP), Linyanti Marsh (2 ♂, BALDOCK), Mauni (4 ♀, OHL), Moremi Reserve (3 ♀, 1 ♂, BMNH), N'Gami (1 ♀, TMP), Semowane River at 20°25′S 26°23′E (1 ♀, BMNH), Serowe (6 ♀). **ERITREA**: Asmara (1 ♀), Cheren (1 ♂, MSNT). **ETHIOPIA**: **Harerge**: Harer (1 ♀, 1 ♂, MNHN; 1 ♀, 2 ♂, MSNT), 5 mi E Harer (1 ♂, USNM), 44 km ENE Jijiga (5 ♂), 37 km SE Jijiga (1 ♀, 6 ♂), 43 km SE Jijiga (5 ♀, 5 ♂; 3 ♀, 2 ♂, AAU). **Shewa**: Langano, about 1600 m, 7°35′N 38°42′E (1 ♀, 1 ♂, OHL). **Sidamo**: Moyale (5 ♀, 8 ♂), 13 km N Moyale (5 ♀, 10 ♂), 16 km N Moyale (1 ♂), 22 km N Moyale (1 ♀, 7 ♂), 26 km N Moyale (3 ♀, 13 ♂; 5 ♂, AAU), 35 km N Moyale (3 ♀, 3 ♂), 100 km N Moyale

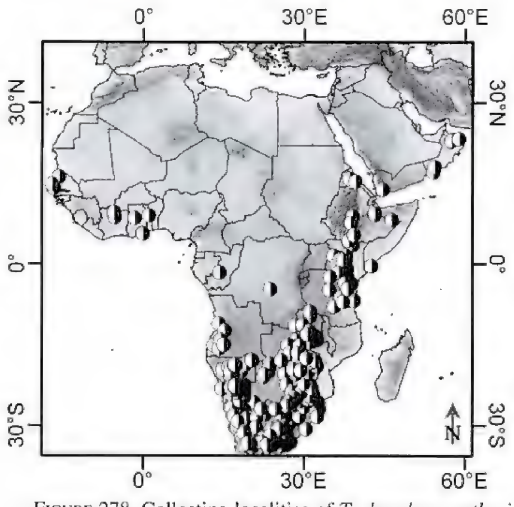


FIGURE 278. Collecting localities of *Tachysphex pentheri* with emarginate male forefemur.

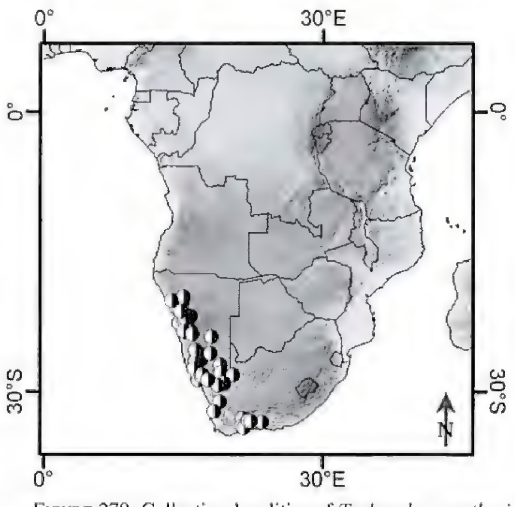


FIGURE 279. Collecting localities of *Tachysphex pentheri* with entire male forefemur.

(1 ♂), 120 km N Moyale (8 ♀, 8 ♂), Negele (1 ♀, GENOVA, holotype of *panzeri* var. *zavattarii*), 76 km N Yabelo, elevation 1880 m (1 ♀), 63 km S Yabelo (5 ♀, 9 ♂; 4 ♀, AAU). **GABON**: Léconi (5 ♀, FSAG). **GHANA**: Kawampe 45 km N Kintampo at 8°30′N 1°35′W (1 ♀), Legon 12 km NNE Accra (3 ♂), Tema (1 ♂). **IVORY COAST**: Niakaramandougou (2 ♀, 4 ♂), Sinématiali 23 km W Ferkessedougou (1 ♀, 4 ♂). **KENYA**: **Coast Province**: Kitani Lodge in Tsavo West National Park (1 ♂), Mount Kasigau (3 ♀), Taita Discovery Centre (2 ♀, 7 ♂), Taita Discovery Centre: Galla Hill area (6 ♀, 7 ♂; 5 ♂, NHMW), ca 10 km N Taita Discovery Centre (1 ♀), 2 km S Voi (2 ♀, 2 ♂), Voi area (1 ♀, OÖLM). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (9 ♀, 7 ♂), 5 km NNE Isiolo (8 ♀, 13 ♂; 5 ♂, UCD), Kibwezi Springs in Machakos District (1 ♂), Laisamis (1 ♀), 32 km NW Mtito Andei (1 ♀), 12 km SW Mwingi (1 ♀), 94 km E Thika (1 ♀, 10 ♂), 118 km E Thika (1 ♀, 1 ♂). **Nairobi**: Karen (1 ♀). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (2 ♀), Lorogi Plateau 6 mi S Kisima (2 ♂), Magadi road 25 air km SW Nairobi (1 ♀, 1 ♂), Magadi road 46 air km SW Nairobi (14 ♀, 28 ♂; 4 ♂, CSE; 4 ♂, CNC; 4 ♂, MCZ; 4 ♀, 10 ♂, NMK; 3 ♂ ZIN), Magadi road 51 air km SW Nairobi (4 ♂), Maralal Game Lodge (4 ♂), Marich Pass Field Studies Centre (1 ♀, 2 ♂), Mpala Research Station 48 km NW Nanyuki (1 ♂; 2 ♀, 9 ♂, LACM), Naivasha (2 ♀, 2 ♂, BMNH), 30 km NW Naivasha (1 ♂), Olorgesailie (5 ♀, 16 ♂; 2 ♀, 5 ♂, NMK), Ol Punyata ca 16 mi N Nakuru at 0°08′S 36°05′E (2 ♀, 1 ♂, LACM), 10 mi SW Sukuta Lol Marmar at 0.82°N 36.68°E (1 ♀, LACM), 10 mi SW Wamba (1 ♂). **LESOTHO**: Leribe (1 ♀, AMG), Mamathes (15 ♀, 17 ♂, AMG; 2 ♂, CU; 2 ♀, SAM; 2 ♀, TMP), Teyateyaneng (2 ♀, 1 ♂, AMG; 3 ♀, ZMAN). **MOZAMBIQUE**: Marraquene (1 ♀, ZMAN). **NAMIBIA**: **Bethanien District**: Barby 26 [Farm] SE 2516 Dc [= between 25°45′ and 26°00′S and 16°30′ and 16°45′E (1 ♀, NMN), Riverside 135 [Farm 15 km SW Bethanie] (3 ♀, 1 *n*, NMN). **Gobabis District**: near Gobabis (1 ♀, AMG), 40 km W Witvlei (5 ♂; 6 ♂, MS). **Grootfontein District**: Alexander Farm 35 km SE Grootfontein (1 ♂, NMN), 30 km NE Grootfontein (1 ♂; 1 ♀, 2 ♂, MS), 40 km NE Grootfontein (5 ♀, 3 ♂; 1 ♂, JG; 2 ♀, 1 ♂, NMN), 90 km NE Grootfontein (1 ♀, JG). **Karasburg District**: Ai Ais on Fish River (1 ♂, SAM), Blinkoog Farm 50 km NE Karasburg (5 ♀, 1 ♂, NMN), Gelaus Farm 65 km W Grünau (1 ♂, NMN), Great Karas Mountains (1 ♀, SAM), 30 km E Karasburg (5 ♀, 1 ♂, 5 *n*, AMG), Karas Mountains at 27°09′S 19°01′E (4 ♀, 6 ♂, 1 *n*). **Karibib District**: Karibib (3 ♂, 1 *n*, JG; 4 ♂, 1 *n*, MS), 15 km E Karibib (1 ♀, 3 *n*; 1 ♀, 2 ♂, JG; 4 ♀, 6 ♂, MS), 43 km E Karibib (1 ♀, MS), 50 km E Karibib (1 ♀, JG), 63 km E Karibib (3 ♀, MS), 20 km N Karibib (1 ♂, MS), 25 km N Karibib (1 ♂, JG; 1 ♀, MS), Khan River 23 km N Karibib (3 ♀, 1 ♂; 1 ♀, MS), Spitzkoppe 17 km from Usakos (1 *n*, PPRI), 97 km from Swakopmund on road to Usakos (1 ♀, 1 *n*, AMG), just E Usakos (1 ♀, AMG), 4 km N Usakos (1 ♀, AMNH), 55 km SW Usakos (7 ♀, 2 *n*; 5 ♀, 1 *n*, MS), 65 km SW Usakos (9 ♀, 2 *n*, MS; 7 ♀, 4 *n*), 17 km W Usakos (1 ♀).

Keetmanshoop: Keetmanshoop (1 ♀, AMG), Mount Brukkaros at 25°52′S 17°48′E (1 ♀, USNM), Tses to Bersheba (1 *n*, AMG). **Khorixas District**: Brandberg: Hungorob Ravine at 21°11′30″N 14°31′40″E (1 *n*, CSE), Brandberg West 70 km WNW Uis Myn (1 ♀, OHL), 4 km E Khorixas (1 ♀, 7 ♂), 2 km W Khorixas (1 ♀, 1 *n*), 120 km from Khorixas on road to Palm (1 ♀, 2 *n*, AMG), road 3245 E Skeleton Coast Park at 20°14′S 13°53′E (4 ♀, AMG), on road to Uis Myn: 94 km from coast at 21°26′S 14°45′E (6 *n*, AMG), 120 km from coast at 21°14′S 14°51′E 93 (1 ♀, 2 *n*, AMG). **Lüderitz District**: Aurusberg at 27°39′S 16°19′E (1 ♀, PPRI), Aus (1 ♂; 2 ♂, BMNH), near Aus on road to Helmeringhausen (6 ♀, 1 *n*, AMG), Aus to Rosh Pinah at 26°50.07′S 16°17.65′E (2 ♀, 7 n, AMG), Klein-Aus Vista at 26°39′S 16°15′E (2 ♀, AMG), Namib Farm 70 km N Aus (1 ♀, 2 ♂, OHL), Namib Farm 60 km NE Aus (1 *n*, OHL), Plateau 38 [Farm] 20 km E Aus (1 ♀, 9 ♂, NMN), 16 km S Rosh Pinah (1 ♀, AMG), Uguchab River near Aurusberg (1 ♀, PPRI). **Maltahöhe District**: SE Büllsport 4 km from road C14 on D854 (1 ♀, AMG), 76 km from Helmeringhausen on road to Spes Bona (1 *n*, AMG). **Mariental District**: Gochas (1 ♀, FSCA), Mariental (1 ♂, AMG; 1 ♀, OHL), 5 km S Mariental (1 ♀, AMG), 73 km S Mariental (1 ♂; 2 ♂, MS), Onze Rust 192 [Farm] (1 *n*, AMG), Vaalbank 319 [Farm] (4 ♂, AMG). **Okahandja District**: Leeu River 9 km W Okahandja (2 ♀, 16 ♂), Okahandja (1 ♀, 4 ♂; 5 ♀, 4 ♂, BMNH; 1 ♂, MS), 70 km N Okahandja (1 ♂, MS), 27 km S Okahandja (1 ♀), Waldau River 17 km W Okahandja (8 ♀, 15 ♂; 1 ♀, JG; 1 ♀, 2 ♂, MS), 40 km W Okahandja (2 ♀, MS). **Omaruru District**: Ojikoko-Süd 61 Farm 40 km ESE Omaruru (1 ♀, BMNH; 2 ♂, NMN), Omaruru (2 ♀, 4 ♂; 1 ♀, JG; 4 ♀, MS), 32 km W Omaruru (2 ♀, 1 ♂, AMG). **Otjiwarongo District**: Kalkfeld (1 ♂, MS), 18 km NE Kalkfeld (6 ♂; 2 ♂, NMN), 20 km NE Otjiwarongo (1 ♀, 2 ♂; 1 ♀, 1 ♂, MS), 15 km NW Otjiwarongo (1 ♀, MS), 25 km NW Otjiwarongo (1 ♂, MS), 28 km NW Otjiwarongo (2 ♂), 80 km S Otjiwarongo (1 ♂, MS). **Outjo District**: 5 km S Kamanjab (3 ♂), 31 km SE Kamanjab (1 *n*), Okaukuejo (3 ♀, 5 ♂; 3 ♀, 4 ♂, MS), Rietfontein 32 mi ENE Okaukuejo (1 ♀), W Ugab River 12 km SE Outjo (1 ♀). **Rehoboth District**: 10 km N Kalkrand (1 ♀), 15 km N Kalkrand (1 ♂, MS), 23 km N Rehoboth (1 ♀, 2 ♂; 1 ♀, 2 ♂, MS), 9 km S Rehoboth (1 ♂; 1 ♀, 2 ♂, MS), 9 mi S Rehoboth (1 ♂, AMNH). **Rundu District**: Rundu (1 ♀, 1 ♂, MS; 2 ♀, 1 ♂, OHL), 25 km E Rundu (1 ♂, MS), 30 km E Rundu (2 ♀, MS), 40 km E Rundu (3 ♀, JG; 1 ♀, 1 ♂, MS), 60 km E Rundu (1 ♂, JG), 80 km SW Rundu (1 ♀, JG), 100 km SW Rundu (1 ♀, 2 ♂; 1 ♂, JG; 4 ♀, MS), 125 km SW Rundu (1 ♂, JG), Takkwasa 52 km E Rundu (1 ♂, NMN). **Swakopmund District**: Ganab (5 ♀, 3 *n*, PPRI), Gaub Pass to Kuiseb Pass (1 *n*, AMG), Gobabeb (2 *n*, ZMUC), *Welwitschia* Forest near Gobabeb (1 *n*), Homeb ESE Gobabeb in *Welwitschia* valley (1 *n*, ZMUC); N Homeb at 23°38′S 15°13′E (1 ♀, PPRI), Kuiseb River near Gobabeb (1 ♀), Mirabeb (1 *n*, PPRI), SE corner of Namib Desert Park at SE 2315Db [= between 23°30′ and 23°45′S and 15°45′E and 16°00′E] (1 ♀, 1 *n*, ZMUC), Namib Desert Research Station (5 ♀, CSE; 2 ♀, USU), near Rossing Mountain at 22°34′S 14°49′E (2 ♀, AMG), 12 km E Springbokwater at 20°15′S 13°44′E (1 ♀, AMG), Swakop River mouth (1 ♀, 10 *n*; 1 *n*, ZMUC), Swakopmund (2 ♀, 3 *n*, AMG; 1 ♀, 5 ♂, JG; 2 *n*, MS), 5 km E Swakopmund (1 ♀, 1 *n*, ZMUC), 10 km E Swakopmund (6 *n*), 15 km E Swakopmund (1 ♀, 1 *n*, JG), 63 km NE Swakopmund (18 ♀, 45 *n*), 40 km NE Swakopmund in rocky hills (2 ♀, ZMUC), Uis to Hentiesbaai at 21°27′S 14°45′E (2 ♀, AMG). **Tsumeb District**: Namutoni (1 ♂, AMG), 30 km E Namutoni (6 ♀, 2 ♂; 2 ♂, MS), Onguma Farm 55 mi NW Tsumeb (5 ♀, 3 ♂, BMNH), 10 km SE Tsumeb (1 ♀; 1 ♀, MS). **Walvis Bay Territory**: Rooibank (1 ♂). **Windhoek District**: Aris 25 km S Windhoek (1 ♀, MS; 2 ♂, CAS, MS), 2 km S Aris (1 ♂), Bismarck River 30 km E Windhoek (2 ♀, 2 ♂; 1 ♀, 1 ♂, MS), Gamsberg east of Pass (3 ♂, AMG), Neudamm 25 km NNE Windhoek (1 ♂, NMN), Regenstein 15 mi SSW Windhoek (1 ♀, BMNH), 17 km ESE Seeis (1 ♀, AMNH), Solitaire at 23°52′S 16°00′E (1 ♀, AMG), Wasservallei (2 ♂, NMN), Windhoek (1 ♀, 2 ♂, NMN), 53 km E Windhoek (1 ♂, MS), 8 km S Windhoek (1 ♂, FSCA), 28 km SE Windhoek (1 ♂). **OMAN**: Ain Razat (1 ♀, KMG), Behla (2 ♂; 3 ♂, KMG), Salalah at 17°00.3′N 54°07.1′E (1 ♀), Samail Gap (1 ♂, KMG), Wadi Ghul near Nizwa at 22°53.0′N 57°31.2′E (1 ♂), Wadi Quryat (1 ♀, KMG). **SENEGAL**: Ndangane 45 air km SE Mbour (1 ♂, FB), 25–35 km S Richard Toll (1 ♀, 1 ♂, ZMAN), 5 km SW Thiès (1 ♂). **SOMALIA**: Bohotle (1 ♀, BMNH), Kismaayo (3 ♀, BMNH). **SOUTH AFRICA**: **Eastern Cape Province**: 42 km W Aberdeen at 32°31′S 23°37′E (1 ♂), Algoa Bay (6 ♀, 3 ♂, TMP), Aliwal North (1 ♀, AMG; 10 ♀, 1 ♂, BMNH), Andries Vosloo Kudu Reserve 32 km NE Grahamstown at 33°05′S 26°47′E (1 ♂; 1 ♀, AMG), Bathurst (2 ♂, AMG), NNW Bedford at 32°33′S 26°00′E (1 ♀), Chalumna W East London (1 ♂, USU), Clifton 18 km NW Grahamstown at 33°11′S 26°24′E (1 ♂, AMG), Colchester at 33°42′S 25°50′E (1 ♀, 1 ♂), Cookhouse (1 ♀, SAM), Cradock (3 ♂, AMNH), 21 mi N Cradock (1 ♀, 2 ♂, AMNH), 7 km S Cradock (1 ♀, 3 ♂, OÖLM), De Aar (1 ♀, AMG), Elandsheuwels Farm 40 km W Steytlerville (4 ♀,

3 ♂, USU), Fort Beaufort: Umdala (1 ♀, SAM), Fort Brown (4 ♀, AMG), Fort Willshire (2 ♀, 1 ♂, AMG), Gamtoos River mouth at 33°58′S 25°01′E (1 ♂, SAM), Goodehoop Farm 16 km W Steytlerville (1 ♀, 5 ♂, USU), Graaff-Reinet (2 ♂, AMG), Grahamstown (1 ♂, AEI; 1 ♀, PPRI; 1 ♀, TMP, lectotype of *pentheri*), 18 km WNW Grahamstown: Hilton Farm (2 ♀, 1 ♂; 23 ♀, 1 ♂, AMG; 4 ♀ determined as *panzeri pentheri* by F. Gess), Kenton-on-Sea (1 ♀, AMG), Kirkwood (2 ♀, OÖLM), Klipdaal in Cradock District (1 ♂, SAM), Middelburg District (2 ♀, SAM), Mountain Zebra National Park at 32°15′S 25°27′E (1 ♀), Olifantsrivier 30 km NNE Uniondale at 33°27′S 23°19′E (1 ♂), Port Elizabeth (1 ♀, 1 ♂, MTM), Queenstown (1 ♀, 2 ♂, BMNH; 1 ♀, AMG), Resolution 17 air km NNE Grahamstown (10 ♀, TMP), Somerset East (1 ♂, AEI), Steynsburg Division (2 ♀, SAM), 2 km N Steytlerville (4 ♂, USU), 6 km N Steytlerville (5 ♀, 2 ♂, USU), 28 km S Steytlerville: Wolwekraal Farm and 30 km S Steytlerville at 33°32.8′S 24°21.3′E (14 ♀, 10 ♂, USU) and 33°38.9′S 24°20.9′E (1 ♀, 1 ♂), Strowan Farm 5 air km W Grahamstown (1 ♀, AMG), Sundays River (1 ♀, 1 ♂, TMP), Table Farm 10 km NW Grahamstown (2 ♀, 1 ♂, AMG), Waterford (1 ♂, AMG), Willowmore (1 ♂; 2 ♂, AMG; 1 ♂, PMA; 1 ♂, paralectotype of *nanus*, SAM; 10 ♀, 2 ♂, 2 *n*, TMP), 9 km E Willowmore (1 ♀, 2 ♂), 43 km NE Willowmore: Plessierivier (3 ♀, 2 ♂, USU), 37 km NW Willowmore in Grootrivierberg Range (9 ♀, 3 ♂, USU), 11 km SW Willowmore at 33°22.3′S 23°24.7′E (1 ♂, USU), 12 km W Willowmore at 33°16′S 23°22′E (2 ♀). **Free State**: Bothaville (1 ♂, AMG; 1 ♀, 1 ♂, TMP), Brandfort District (1 ♀, SAM), Caledon River between Bethulie and Alival North (1 ♂, SAM), 30 km N Colesville at Orange River (4 ♀, 1 ♂, OÖLM), Harrismith (1 ♂, BMNH), Sandveld Nature Reserve ca 5 air km E Bloemhof at 27°40′S 25°41′E (3 ♂), Tussen Die Riviere Game Reserve (2 ♀, PPRI). **Gauteng**: Benoni (1 ♀; 1 ♀, AMG), Bordeaux (1 ♀, SAM), Bronkhorstbaai ca 8–9 km S Bronkhorstspruit(2 ♀, AMG), Florida Lake (1 ♀, 1 ♂), Johannesburg (1 ♀, PPRI), Johannesburg: Mondeor Hills (1 ♀, AMG), Krugersdorp (2 ♀, AMG), Pretoria (1 ♀; 1 ♀, AEI; 1 ♀, AMG; 1 ♀, TMP), Pretoria: Botanical Garden (8 ♂), Pretoria: Lynnwood at 25°48′S 28°22′E (4 ♂), Randburg (1 ♀), Roodeplaat (2 ♀, PPRI), Tswaing (4 ♂), Wapadrand 8 km E Pretoria at 25°48′S 28°22′E (1 ♀). **Kwazulu-Natal**: SW Emanguzi (16 ♀, 28 ♂, OÖLM), Kosi Bay at 26°58′S 32°48′E (1 ♀, PPRI), Mbazwana (1 ♀, OÖLM), Ndumu Game Reserve (1 ♂, ZMAN), 5 km W Port Shepherd (1 ♀, USNM), St. Lucia Bay (1 ♀, RMNH). **Mpumalanga**: Barberton (1 ♀, AMG), Crocodile Bridge in Kruger National Park (4 ♀, 1 ♂, PPRI), Crocodile River Road in Kruger National Park (2 ♀, 1 ♂, PPRI), Ermelo (1 ♀, AMG), Loskop Dam Nature Reserve (1 ♀, 1 ♂, PPRI), Pretoriuskop in Kruger National Park (1 ♂, USNM), Sabie (2 ♂, AMG), Satara in Kruger National Park (1 ♀, PMA), Skukuza in Kruger National Park (1 ♀, PPRI, 2 ♀, PMA), Struben's Valley (3 ♀, 1 ♂, AMG). **Northern Cape Province**: Aggeneys (2 ♀, SAM), Augrabies to Blouputs at 28°36′S 20°13′E (1 ♀, AMG), Colesberg (1 ♀, SAM), Garies: Klip Vlei (1 ♀, SAM), 40 km SE Garies at Groen River (1 ♀, 1 ♂, OÖLM), Goegap Nature Reserve 10 mi E Springbok (2 ♀, BMNH), Hondeklipbaai (1 ♂, OÖLM), 18 km E Hondeklipbaai at 30°21′34″S 17°26′27″E (1 ♀, CSE), Kamiesberg to Sors Sors at 30°11′S 18°01′E (1 ♀, AMG), E Kamieskroon (1 ♀, OÖLM), Langklip 103 km WNW Upington (1 ♀, AMG), Olifantshoek (11 ♂, FSCA), Onseepkans (1 ♀, AMG), Pachtvlei E Alexander Bay at 28°33′S 16°34′E (1 *n*, AMG), Pofadder (1 *n*, SAM), 60 km N Port Nolloth at 28°47′S 16°37′E (1 *n*, AMG), Richtersveld National Park at 28°18.9′S 16°58.3′E (2 ♂) and Koeroegabvlakte at 28°11′S 17°03′E (1 *n*, AMG), road to Richtersveld National Park between Annis and Dabie Rivers at 28°20′S 16°55′E (1 *n*, AMG), Roggekloof S Sutherland (1 ♀, OHL), 90 km ENE Springbok at 29°20.1′S 18°44.3′E (1 *n*), SW Springbok at Buffels River (2 ♂, OÖLM), 50 km SW Springbok at Buffels River (1 ♂, OÖLM), Steinkopf (1 ♂, FSCA), Tanqua Karoo at Renoster River (1 ♀, SAM), Upington (1 ♀, 1 ♂, AMG), VanWyksfontein 8 km W Norvalspont (2 ♀, AMG), 90 km W Van Zylsrus which is 26°52′S 22°04′E (1 ♂, MS), Vioolsdrift (3 *n*, SAM), 22 km E Williston (1 ♂, AMG). **Northern Province**: Afguns (1 ♀, AMG), Beacon Ranch 20 km NW Gravelotte (2 ♀, 1 ♂, PMA), Buffelspoort (1 ♂; 1 ♂, AMG), D'Nyala Nature Reserve (2 ♂, PPRI), Ellisras (1 ♀, 1 ♂; 9 ♀, 8 ♂, AMG), Guernsey Farm 15 km E Klaserie (10 ♀, 3 ♂, PMA), Guernsey Farm 15 km NW Klaserie (3 ♀, 3 ♂, PMA), Klaserie (3 ♂, PMA), Langjan Nature Reserve (3 ♀, PPRI), Lapalala Nature Reserve at 23°51′S 28°17′E (1 ♂, PPRI), Messina (2 ♀, PPRI), Mogol Nature Reserve (16 ♀, 18 ♂, PPRI), Naboomspruit (1 ♀, PPRI; 1 ♀, SDNHM), 10 km SW Naboomspruit (16 ♀, FSCA), Nwanblya waterhole near Shingwidzi in Kruger National Park (1 ♀, ZMAN), Nylsvley Nature Reserve (1 ♂, PPRI), Pafuri in Kruger National Park (1 ♀, PPRI), Pietersburg (3 ♂, FSCA), Punda Maria in Kruger National Park (6 ♀, 2 ♂, ZMAN), 5 mi N and 5 mi W Warmbad (4 ♀, 3 ♂, USNM), "N.E. Zoutp. dist." [probably NE Zoutpansberg near Louis Trichard] (1 ♀, 2 ♂, TMP). **North-West Province**: 45 km N Pretoria (2 ♀, 1 ♂, MS), Rustenburg

(2 ♂, AMG), Rustenburg Nature Reserve (1 ♀, PPRI), Ventersdorp (1 ♀, 1 ♂, AMG), Vryburg (3 ♀, 2 ♂, AMG). **Western Cape Province**: Barrydale (1 ♂, OÖLM), Beaufort West (1 ♂, SAM), Bo Kouga in Uniondale District (1 ♂, SAM), Bontebok National Park 7 km S Swellendam (2 ♀, PMA), Cape of Good Hope Nature Reserve (1 ♀, USNM), Cape Town including Milnerton (1 ♂; 1 ♂, BMNH; 2 ♀, 2 ♂, USNM), 60 km N Cape Town (9 ♂, OÖLM), Cederberg (1 ♂, RMNH), Ceres (1 ♀, BMNH), Citrusdal at Olifants River (1 ♂, OHL), 20 km N Citrusdal (13 ♂, OÖLM), Clanwilliam (1 ♀, USU), Clanwilliam: Bulshoek (1 ♀, SAM), 40 km E Clanwilliam: Sevilla (4 ♀, 6 ♂, USU), 21.5 km ENE Clanwilliam at 32°04′45″S 19°05′00″E (1 ♀, CSE), 18 km S Clanwilliam at 32°17′S 18°56′E (2 ♂, AMNH), 11 km W Clanwilliam: Ysterfontein Farm (2 ♂, USU), Dasklippas in Cederberg Mts. NE Porterville (1 ♂, OHL), Dikbome Farm near Merweville (5 ♀, 2 *n*, SAM), Doringbos at 31°58′19″S 19°13′33″E (1 ♂, CSE), Elisabethfontein 19 km NE Clanwilliam at 32°04′45″S 19°03′29″E (1 ♀, CSE), Graafwater (1 ♀, FSCA), Greyton (1 ♀, 2 ♂, OÖLM), Hermanus (1 ♀, SAM), Karoo National Park at 32°20′S 22°30′E (4 ♀, 1 ♂, PPRI), Keurboom River near Plettenberg Bay at 34°02′S 23°24′E (1 ♀, PPRI), Knersflakte: Heuweltjie at 31°17.1′S 18°36.1′E (1 ♀, OHL), Knersflakte: Kalkgat (1 ♀; 2 ♀, 5 ♂, OHL), Konstabel Farm 30 km WSW Matjiesfontein (2 ♀, 2 ♂), Koup at 33°07′S 21°17′E (1 ♀), Laingsburg at 33°12′S 20°51′E (1 ♀), Laingsburg Division (1 ♀, SAM), Lambert's Bay (4 ♀, OÖLM), 9 km ENE Lambert's Bay at 32°04′30″S 18°23′30″E (1 ♀, CSE), S Lambert's Bay (10 ♀, 7 ♂, OÖLM), 5 km S Lambert's Bay (13 ♂, 2 *n*, OÖLM), 40 km S Lambert's Bay (45 ♀, 72 ♂, OÖLM), Lammerfontein in Moordenaars Karoo (1 ♀, SAM), Langberg (1 ♀, 17 ♂, 9 *n*, OÖLM), Little Karoo SE Groot River (1 ♀, 2 ♂, 1 *n*, OÖLM), Matjiesfontein (1 ♀, 1 ♂; 5 ♀, 3 ♂, BMNH), Mossel Bay (6 ♀, 14 ♂, BMNH), Murraysburg (1 ♀, 3 ♂, SAM), Oudtshoorn at 33°37′S 22°13′E (1 ♀), 35 km S Oudtshoorn (2 ♂; 1 ♂, BMNH; 1 ♀, PMA), Outdshoorn-Zebra (1 ♂, SAM), Pakhuis (2 ♀, 2 ♂, RMNH), Paleisheuwel (1 ♀, AMG), Plettenberg Bay (1 ♀, RMNH), 10 km NW Prince Albert (1 *n*, UCD), Stellenbosch (1 ♀, TMP), Swartrivier 7 km NW Prince Albert (1 ♂, 1 *n*), Swellendam (3 ♂, FSCA), Theronsberg Pass 29 km ENE Ceres (1 ♀, AMG), Tierberg Farm 23 km NE Prince Albert (1 ♀, 1 *n*), 18 mi SE Touwsrivier (1 ♂, KU), Uniondale (1 ♀, PPRI), 10 km NE Vanrhynsdorp (1 ♂, OÖLM), Wellington: Rooshoek (4 ♀, 4 ♂; 17 ♀, 20 ♂, RMNH), Witzenberg Valley near Ceres (1 ♀, BMNH). **TANZANIA**: **Coast Region**: 17 km E Chalinze (1 ♀, 1 ♂). **Dar es Salaam Region**: Dar es Salaam (1 ♀, ZMAN). **Iringa Region**: 18 km W Iringa (1 ♀, 1 ♂). **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya (3 ♀, 4 ♂, SAM), 61 km NNE Same (1 ♀), 19 km SE Same (1 ♀). **Mara Region**: Seronera in Serengeti National Park (1 ♀, 1 ♂). **Morogoro Region**: 128 road km NW Morogoro (1 ♀), 60 road km SW Morogoro (1 ♂). **Singida Region**: Singida (4 ♀, 1 ♂). **Tanga Region**: 73 km NW Korogwe (20 ♀, 30 ♂; 4 ♀, 6 ♂, UDS), 2 km NE Mkomazi (1 ♀, 2 ♂). **TOGO**: 5 km W Sokodé (1 ♂; 2 ♀, FSAG). **YEMEN**: El Air ca 3 mi W San'aa (1 ♂, KMG). **ZAIRE**: **Kasai–Oriental**: 39 mi NE Lusambo (1 ♀). **Shaba**: Kitele at 11°22′S 28°24′E (1 ♀). **ZAMBIA**: **Central Province**: Chibombo 97 road km N Lusaka (3 ♂), 25 km SSW Kapiri Mposhi (1 ♀), 2 km E Mumbwa (1 ♀, 4 ♂), 6 km W Mumbwa (1 ♀, 1 ♂; 1 ♀, 2 ♂, MSNT), 30 road km NE Serenje (2 ♀), 54 road km NE Serenje (4 ♀, 2 ♂). **Eastern Province**: 50 km NW Chipata (1 ♂), 60 km SW Chipata (2 ♀, 1 ♂), 40 km E Katete (1 ♀, MSNT), 11 km SE Katete (1 ♀), 6–18 km SW Mfuwe (1 ♀), 20 km SW Mfuwe (1 ♂, MSNT), 31 km E Petauke (1 ♀, 4 ♂), 32 km E Petauke (5 ♂; 2 ♀, 2 ♂, MSNT), 42 km SW Petauke (2 ♂). **Luapula Province**: Monfuli at Lake Bangweulu (1 ♀, BMNH). **Lusaka Province**: Chilanga 15 km S Lusaka (2 ♂), Lusaka International Airport (2 ♀, 4 ♂), ca 20 km E Lusaka International Airport (1 ♀), 25 km E Lusaka (1 ♀, 3 ♂), 65 km WNW Lusaka (1 ♂), 50 km W Rufunsa (1 ♀). **Northern Province**: 60 km N Kasama (1 ♂), 16 km W Mbala (1 ♀), 78 km SSW Mpika (1 ♀, 4 ♂), near Mpulungu (1 ♂), 65 road km NE Serenje (2 ♀). **Southern Province**: 5 km E Choma (2 ♂; 1 ♂, MSNT), 56 road km NE Choma (2 ♀, 2 ♂; 1 ♀, 1 ♂, MSNT), 22 km E Kalomo (4 ♂), 25 km E Kalomo (2 ♂, MSNT), 7 km SW Kalomo (3 ♀, 4 ♂; 5 ♀, 3 ♂, MSNT; 2 ♀, NHMZ), 9 km SW Kalomo (3 ♂), 18 km NE Pemba (1 ♀). **ZIMBABWE**: Beitbridge (1 ♀, BMNH), Bembesi River (1 ♀, TMP), Bulawayo (3 ♀, 2 ♂, AMG; 1 ♀, 1 ♂, PPRI; 10 ♀, 3 ♂, SAM, including paralectotype female of *caliban*; 8 ♀, 7 ♂, TMP), Bulawayo airport (4 ♀, 7 ♂), Bulawayo: Hillside (1 ♀, 6 ♂; 1 ♂, TMP), Chishawasha near Harare (2 ♀, 1 ♂, BMNH), Dawn Mine 45 km NE Bulawayo (1 ♀, 1 ♂), Gokwe: Sengwa (1 ♀, PMA), 15 km E Gweru (1 ♀), 30 km S Gweru (1 ♂, USU), Harare: Mukuvisi Game Park (1 ♂), 30 km W Harare (1 ♂, OÖLM), Iwaba near Kwekwe (1 ♂, BMNH), Kami Ruins (6 ♀, 23 ♂; 5 ♂, NHMZ; 1 ♀, SAM; 5 ♂, USNM), Kariba (2 ♀ 4 ♂), Lion and Cheetah Park 24 km W Harare (1 ♀), Masvingo (1 ♀, OÖLM), Matobo (1 ♀, OÖLM), Mbizi Game Park (= Rocky Farm) 20 km SE Harare (1 ♀, 2 ♂), 11 km NE Nyamandhlovu

(1 ♀, 7 ♂), 7 km WSW Nyamandhlovu at Kami River (2 ♂), Odzi in Umtali District (1 ♀, TMP), Redbank at Kami River (2 ♀, 15 ♂; 5 ♂, NHMZ), Rhodesdale (1 ♀, TMP), Rhodesville (1 ♀ BMNH), St. Benedict 30 km N Macheke (2 ♀, 2 ♂; 3 ♀, 4 ♂, JG), Sawmills (1 ♂; 1 ♀, 2 ♂, AMG; 3 ♀, SAM; 1 ♀, 1 ♂, TMP), Shangani (1 ♀, BMNH), T.R.S. [= Trelawney Research Station WNW Harare] (1 ♂, AMG), Victoria Falls (1 ♀, 3 ♂; 6 ♀, 2 ♂, KMG).

Tachysphex perniger Arnold

Figures 280–281.

Tachysphex perniger Arnold, 1947:166, ♀, ♂. Lectotype: ♀, Madagascar: Antsirabe (MNHN), **here designated**, examined.— Leclercq, 1960:98 (comparison with *Tachysphex micromegas*), 99 (Madagascar: locality records); Bohart and Menke, 1976:275 (listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Recognition.— *Tachysphex perniger*, an all black endemic of Madagascar, has the setae straight, oriented anterolaterad on the propodeal dorsum, and no ventral spines on apical tarsomeres. Unlike other Madagascan species with these characteristics (*anceps*, *fugax*, *saturnus*, *seyrigi*), the female of *perniger* has the silvery tergal fasciae inconspicuous, present only laterally. In addition, the foretibial outer surface of some, but not all, females has an impunctate, glabrous zone (tibiae evenly punctate and setose throughout in the other species). The male clypeus is distinctive (Fig. 280b): the free margin of the middle lobe has a well-defined corner, the corners being closer to each other than to the adjacent orbit. Additionally, sterna III–VI are practically impunctate anterad of the apical depressions. The clypeus is similar in *platystethus*, in which, however, most erect setae are sinuous and the sterna are densely punctate.

Description.— Scutal punctures well defined, averaging less than one diameter apart (but many discal punctures up to 2–3 diameters apart in female and some males). Scutellum slightly flattened. Mesopleural punctures well defined, about one diameter apart at center; interspaces microsculptured. Episternal sulcus complete. Propodeal dorsum irregularly rugose, side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area and midfemoral venter, about one midocellar diameter long; erect on each side of oral fossa next to occipital carina, about 0.3 × basal mandibular width; erect on scutum; diverging anterolaterad from midline on propodeal dorsum.

Head, thorax, legs, and gaster black, mandible reddish in apical half (excluding apex), tarsal apex brown. Frontal setae silvery in both sexes. Wing membrane moderately infumate; forewing costal and subcostal veins brown. Terga I–III silvery fasciate apically, but fasciae present only laterally in female and some males; also tergum IV fasciate laterally in some males.

♀.— Labrum emarginate. Clypeus (Fig. 280a): bevel slightly longer than basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.4–1.6 × length. Dorsal length of flagellomere I 1.9–2.0 × apical width. Scutellum slightly flattened. Forefemoral venter with minute, ill-defined punctures that are several diameters apart. Dorsal foretibial surface with a few, suberect bristles; outer surface with a few bristles, in some specimens impunctate and glabrous. Forebasitarsus with nine rake spines. Apicoventral margin of apical tarsomeres minimally arcuate. Tergum V with a few, sparse punctures; apical depression impunctate, glabrous. Pygidial plate with minute punctures that average many diameters apart; interspaces unsculptured. Length 7.3–7.8 mm.

♂.— Mandible: trimmal carina with tooth, without cleft or with small cleft. Clypeus (Fig. 280b): bevel ill defined, shorter than basomedian area; lip in most specimens inconspicuous, present only mesally, roundly arcuate, absent in some specimens; free margin of middle lobe with well-defined corner; distance between corners 0.7 × distance between corner and orbit. Width of postocellar area 1.4–1.5 × length. Dorsal length of flagellomere I 1.6–1.7 × apical width. Forefemoral

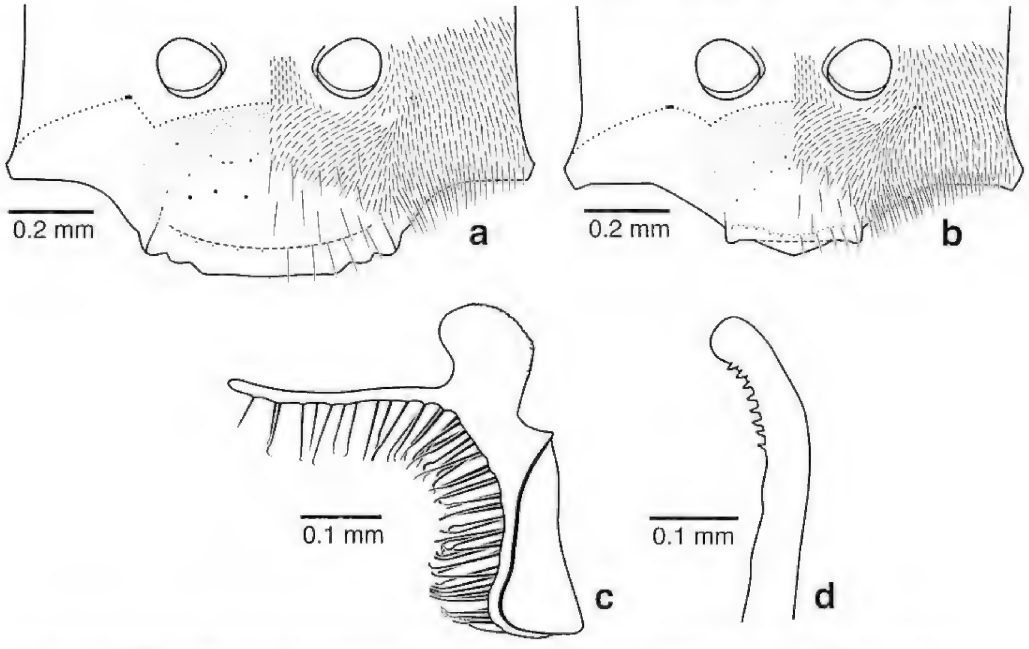


FIGURE 280. *Tachysphex perniger* Arnold: a – female clypeus; b – male clypeus; c – volsella; d – penis valve.

notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venter of tarsomeres V, in many specimens, with thin preapical spine. Sterna III–VI with a few, sparse punctures except apical depressions punctate. Sternum VIII evenly emarginate apically or bottom of emargination markedly convex mesally. Length 5.2–7.5 mm. Volsella and penis valve: Figs. 280c, d.

PREY.— A female (SAM) is pinned with a gryllid nymph, 5.5 mm long, presumably her prey, as reported by Arnold (1947).

GEOGRAPHIC DISTRIBUTION (Fig. 281).— Madagascar.

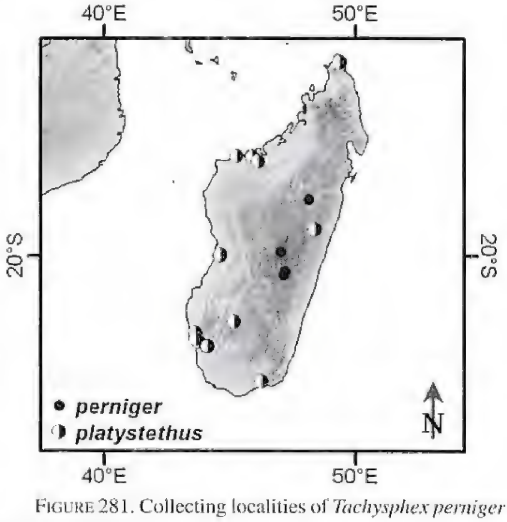


FIGURE 281. Collecting localities of *Tachysphex perniger* and *platystethus*.

RECORDS.— **MADAGASCAR: Antananarivo**: Antsirabe (1 ♀, 1 ♂; 1 ♀, 1 ♂, BMNH; 2 ♀, 10 ♂, MNHN, including lectotype ♀ of *perniger*; 14 ♂, MRAC; 4 ♀, 4 ♂, SAM, including a pair of paratypes). **Fianarantsoa**: Ankazomivady 28 km SSW Ambositra at 20°46.5′S 47°10.1′E (1 ♂), Ivato (1 ♂, LB). **Toamasina**: Morarano-Chrome (2 ♂; 2 ♂, MRAC).

***Tachysphex platystethus* Pulawski, sp. nov.**
Figures 281, 282.

Derivation of name.— *Platystethus* derives from two Greek words: *platys*, flat; and *stethos*, breast, thorax. An allusion to the flattened thorax of this species female.

Recognition.— *Tachysphex platystethus*, an all black endemic of Madagascar, is easily recognizable by its propodeal sculpture: the entire dorsum is ridged, but the ridges diverge posterad on the basal quarter to half and are contrastingly transverse on the remaining surface (Fig. 282c), although the ridges are similar in many *saturnus* and some *seyrigi*. The female has a unique combination of a flattened thorax and the apical tarsomeres not angulate basoventrally and without spines on venters or lateral margins (Fig. 282e); also, the pygidial plate is unusually narrow, with the lateral carinae present only apically (carinae almost parallel). The male clypeus is distinctive although somewhat similar to that of *perniger*: the lip is rounded to nearly rectangular mesally, nearly reduced laterally, with a well-defined corner (Fig. 282b). Also, male sterna of *platystethus* are densely punctate, but largely impunctate in *perniger*. The thoracic setae of most *platystethus* are also distinctive, although similar to those of *ampijoroa*: sinuous on the mesopleuron and pointing obliquely anterad on the propodeal dorsum (but pointing posterad in some specimens). See *ampijoroa* for differences (p. 688)

Description.— Frons dull, markedly microsculptured. Scutal punctures well defined, averaging several diameters apart in female, 2–3 diameters in male; interspaces uniformly microsculptured. Mesopleural punctures averaging 3–4 diameters apart; interspaces uniformly microsculptured. Punctures of mesothoracic venter several diameters apart. Propodeal dorsum finely ridged; ridges divergent posterad on basal quarter to half, becoming transverse on remaining surface (Fig. 282c); side varying from punctate to ridged. Hindcoxal dorsum with inner margin carinate, carina slightly expanded basally.

Setae (numbers represent setal length expressed as a fraction of basal mandibular width): erect on postocellar area, sinuous in female (0.3–0.4), straight or slightly sinuous in male (0.3); erect, at least slightly sinuous on each side of oral fossa next to occipital carina (0.4); on scutum erect or inclined posterad (0.2–0.3), sinuous in female, straight in male; sinuous on mesopleuron; erect on midfemoral venter, sinuous in female (0.4) and some males, straight in most males (0.1–0.2); on propodeal dorsum sinuous, in most specimens oriented obliquely anterad except oriented obliquely posterad basomedially, but oriented posterad in males from Parc National de Baie de Baly.

Head, thorax, legs, and gaster black, mandible reddish mesally, tarsal apex black or brown. Frontal setae silvery in both sexes. Wing membrane slightly infumate, almost hyaline; forewing costal and subcostal veins dark brown. Terga I-III silvery fasciate apically, tergum IV fasciate apicolaterally.

♀.— Labrum emarginate. Clypeus (Fig. 282a): bevel about as long as basomedian area; lip free margin arcuate, not emarginate mesally, laterally broadly, shallowly sinuous but not incised. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width. Thorax flattened, scutellum barely convex. Midtrochanteral venter with minute punctures that are several diameters apart. Fore- and midfemoral venter with minute punctures that are many diameters apart. Dorsal foretibial surface with one or two thin spines and a few suberect bristles; outer surface narrowly asetose, with several erect bristles. Forebasitarsus with 9-11 rake spines. Tarsomeres IV as wide as long; dorsoapical emargination somewhat rounded basally; apicoventral margin almost straight. Tarsomeres V somewhat elongate, not angulate basoventrally, without spines on venter or lateral margin; apicoventral margin arcuate (Fig. 282e). Tergum V with minute punctures that are many diameters apart, apical depression impunctate, glabrous. Pygidial plate narrower than aver-

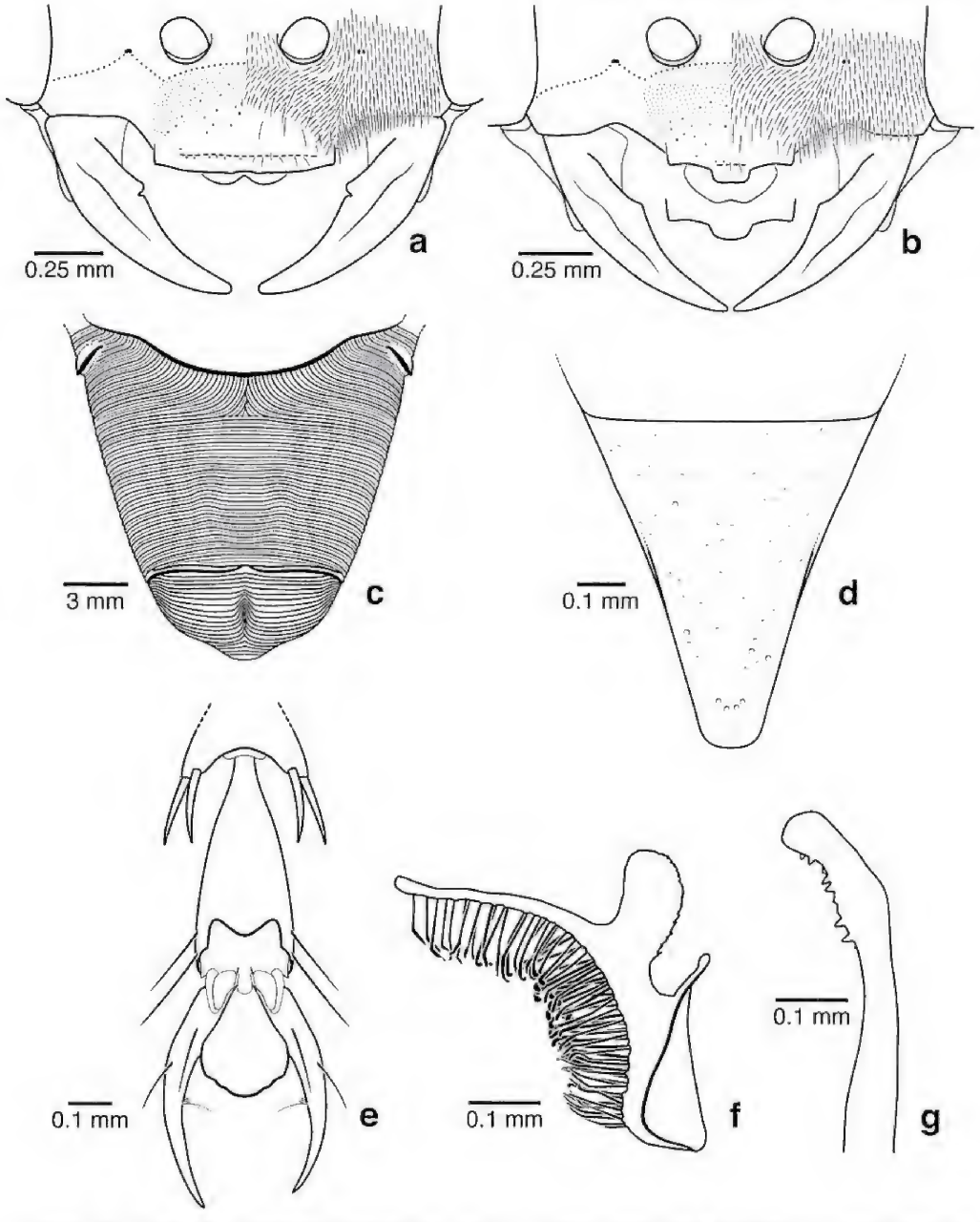


FIGURE 282. *Tachysphex platystethus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible with outline showing variation of free margin; c – propodeal dorsum showing sculpture; d – pygidial plate of female; e – female hindtarsomere V in ventral view; f – volsella; g – penis valve.

age for the genus (Fig. 282d, most punctures more than one diameter apart (but less than that apically), interspaces unsculptured; lateral carina well defined only apically (carinae nearly parallel). Length 9.0–10.0 mm.

♂.— Mandible: trimmal carina obtusely dentate, without cleft. Clypeus (Fig. 282b): bevel markedly shorter than basomedian area; lip rounded to nearly rectangular mesally (separated by constriction from basomedian area in some specimens), nearly reduced laterally, with well-defined corner; distance between corners 0.8–0.9 × distance between corner and orbit. Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 1.9–2.0 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length 6.8-8.0 mm. Volsella and penis valve: Figs. 282f, g).

GEOGRAPHIC DISTRIBUTION (Fig. 281).— Madagascar.

RECORDS.— HOLOTYPE: ♀, **MADAGASCAR**: **Toliara Province**: 12 km SE Toliara at 23°25′S 43°45′E, WJP, 12–13 Apr 1994, WJP (CAS). PARATYPES: **MADAGASCAR**: **Antsiranana**: Orangea 3 km SE Ramena, 27–30 Jan 2001, M.E. Irwin, E.I. Schlinger, and R. Harin'Hala (1 ♂); 1 km W Sakalava Beach (2 ♂), 21–23 Jan 2001, same collectors (1 ♂); 3 km W Sakalava Beach, 23-27 Jan 2001, same collectors (1 ♂). **Fianarantsoa**: Isalo National Park at 22°36′S 45°10′E, 18–19 Mar 1994, AM (1 ♀, MSNT). **Mahajanga**: Mahavavy River 6.2 km SE Mitsinjo at 16°03′06″S 45°54′30″E, 1–5 Dec 2002, B. Fisher, Ch. Griswold, et al. (2 ♂); Parc National d'Ankarafantsika: Forêt de Tsimaloto 18.3 km NE Tsaramandroso at 16°13′41″S 46°8′31″E, 2-8 Apr 2001, B. Fisher, Ch. Griswold, et al. (1 ♂); Parc National de Baie de Baly at 16°00′36″S 45°15′54″E, 26-30 Nov 2002, B. Fisher, Ch. Griswold, et al. (1 ♂); Parc National Tsingy de Bemaraha at Ankidrodroa River at 19°07′56″S 44°48′53″E, 11–15 Nov 2001, B. Fisher, Ch. Griswold, et al. (4 ♂). **Toamasina**: botanical garden near entrance to Andasibe National Park at 18°55′58″S 48°24′47″E, 1–5 Sept 2001, R. Harin' Hala (1 ♀, 1 ♂). **Toliara**: Bereboka 60 km NE Morondava, 18–23 May 1983, J.S. Noyes and M.C. Day (3 ♀, 4 ♂, BMNH); Berenty, 5–15 May 1983, J.S. Noyes and M.C. Day (1 ♀; 3 ♀, 2 ♂, BMNH), 2–9 Apr 1994, WJP (1 ♂); Forêt de Kiryndy 15.5 km ENE Marofandilia at 20°02′42″S 44°39′44″E, 28 Nov–3 Dec 2001, B. Fisher, Ch. Griswold, et al. (1 ♀, 2 ♂); Ifaty 22 km N Toliara at 23°11′S 43°37′E, 18 Apr 1998, M.E. Irwin and E.I. Schlinger (1 ♀); Manderano at 23°31′38″S 44°05′15″E, 22–29 May 2002, Frontier Wilderness Project (1 ♂); Mangily 7 km N Ifaty, 27–30 May 2000, L. Blommers (1 ♀, LB); 50 km NE Morondava, 9 Dec 1991, A. Pauly (2 ♀; 2 ♀, 1 ♂, MRAC); 5 km N Toliara at 23°18′S 43°39′E, AM (1 ♀, MSNT); 12 km SE Toliara at 23°25′S 43°45′E, WJP, 26–28 Mar 1994 (3 ♂), 12–13 Apr 1994 (1 ♀).

Tachysphex plicosus (A. Costa)

Figures 283–285.

Tachytes plicosus A. Costa 1867a:83, ♀ (as *plicosa*, incorrect original termination). Holotype: ♀, Italy: Calabria: Aspromonte (NAPOLI), examined in 1971.— As *Tachysphex plicosus*: Kohl, 1885:396 (new combination, original description copied); Dalla Torre, 1897:684 (in catalog of world Hymenoptera); de Beaumont, 1936c:7 (synonymy); Giordani Soika, 1939:73 (Italy); de Beaumont, 1940:174 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); Guiglia, 1943a:71 (Albania); de Beaumont, 1947a:203 (in revision of Egyptian *Tachysphex*), 1954:58 (Italy); Grandi, 1954:240 (Italy); de Beaumont, 1959:28 (Sicily); Pulawski, 1971:258 (in revision of Palearctic *Tachysphex*); Erlandsson, 1974:73 (France, Yugoslavia); Evans, 1974:719 (larva); Pulawski, 1974b:715 (Bulgaria, nest and prey); Bohart and Menke, 1976:276 (listed); Pulawski, 1978:216, 220 (in key to Sphecidae of European USSR); Pagliano, 1980:128 (Italy); Rodgers and Homewood, 1982:233 (Tanzania); Hensen and van Ooijen, 1987:16 (Turkey); Pagliano, 1990:105 (in catalog of Italian Sphecidae); Gayubo and Borsato, 1994:208 (Italy); Krombein and Pulawski, 1994:11 (summary of life history), 43 (in revision of Sri Lankan *Tachysphex*); Negrisolo *in* Minelli, Ruffo, and La Posta, 1995b:9 (in catalog of Italian fauna); Schmid-Egger and Bitsch *in* Bitsch et al., 2001:266 (in Sphecid Fauna of Western Europe); Gayubo, Gonzáles, Tormos, and Asís, 2002:5 (distribution in Spain).

Tachytes plicosus A. Costa 1867b: 27, ♀ (as *plicosa*, incorrect original termination). Objective synonym of *Tachytes plicosus* A. Costa, 1867a.

Tachysphex gallicus Kohl, 1883a:167, ♀ (as *gallica*, incorrect original termination). Syntypes: ♀, France: Marseille (NHMW), examined before 1971. Synonymized with *Tachysphex plicosus* by de Beaumont,

1936a:211 and 1936c:7.— Kohl, 1885:377 (in revision of Larrini); Dalla Torre, 1897:680 (in catalog of world Hymenoptera); de Gaulle, 1908:121 (listed from France); Berland, 1925:119 (in Sphecid Fauna of France); de Beaumont, 1936a:211 (in revision of French *Tachysphex*, description of ♂); Grandi, 1937:332 (Italy); Dollfuss, 1989:13 (type material in NHMW).

Tachysphex striolatus Cameron, 1903:126, ♀ (as *striolata*, incorrect original termination). Holotype: ♀, India: Barrackpore 20 km N Calcutta (OXUM), examined in 1970. Synonymized with *Tachysphex plicosus* by Pulawski, 1971:460.

Tachysphex egregius Arnold, 1924:66, ♂. Holotype: ♂, Zimbabwe: Bulawayo (SAM), examined. Synonymized with *Tachysphex plicosus* by Pulawski *in* Krombein and Pulawski, 1994:44.— Arnold, 1929:384 (description of ♀, South Africa), 1930:3 (in checklist of Afrotropical Sphecidae), 1951:155 (Ghana, Mali); Bohart and Menke, 1976:273 (listed).

Recognition.— *Tachysphex plicosus* has a distinctive propodeal sculpture: the side has large, sparse punctures and is separated by a carina from the dorsum, which in most specimens is obliquely ridged except ridges are transverse mesally or apicomesally (Figs. 283c, d); transverse ridges are inconspicuous in occasional specimens, and the entire dorsum is transversely ridged in others. In the female, the trimmal carina has a prominent tooth but no cleft (Fig. 283a), the forebasitarsus has no spines on the venter, and the rake spines of its outer margin are separated into a distal and an apical groups (Fig. 283e). Additional recognition features are: erect setae of head and thorax sinuous, hindcoxal dorsum with basal tooth, and clypeal lip markedly sinuate in female (Fig. 283a), rounded in male (Fig. 283b).

Description.— Frons in most specimens dull, conspicuously microsculptured, with evanescent punctures that are several diameters apart, but shiny in some specimens, with microsculpture inconspicuous and punctures well defined. Scutum with short, longitudinal ridges next to hindmargin, with punctures averaging more than one diameter apart on disk (several diameters apart in many specimens). Mesopleuron with conspicuous punctures; punctures of mesothoracic venter. in many specimens, averaging more than one diameter apart. Upper metapleuron with longitudinal carina in front of propodeal spiracle (beneath flange's posterior end); carina varying from conspicuous to evanescent. Propodeum with longitudinal carina between dorsum and side; dorsum, in most specimens, obliquely ridged except transversely ridged mesally or apicomesally (Figs. 283c, d); in some specimens transverse ridges nearly absent, inconspicuous, in others all ridges transverse; side with large, sparse punctures (interspaces shiny), but ridged adjacent to anterior, ventral, and posterior margins. Forebasitarsus without ventral spines. Hindcoxal dorsum with inner margin conspicuously angulate basally.

Setae suberect to erect and sinuous on head and thorax (longest setae about half length of basal mandibular width), not concealing integument, somewhat inclined posterad on propodeal dorsum.

Head, thorax, legs, and gaster black, apical tarsomeres brown. Frontal setae silvery in both sexes. Wing membrane hyaline, costal vein of forewing light brown, subcostal vein dark brown to black. Terga I–IV silvery fasciate apically, but fasciae ill defined in many specimens.

♀.— Mandible: trimmal carina with prominent tooth and no cleft, broadly emarginate distad of tooth (Fig. 283a). Clypeus (Fig. 283a): bevel shorter than basomedian area, free margin of lip markedly sinuate, with roundly prominent corner, not emarginate mesally or laterally. Width of postocellar area 1.9–2.2 × length. Dorsal length of flagellomere I 1.8–2.1 × apical width. Forefemoral venter shiny, with minute punctures that are several to many diameters apart. Dorsal foretibial surface with several suberect, inconspicuous bristles; outer surface of foretibia with a few short, suberect bristles but without spines. Forebasitarsus with concave outer margin, with nine or ten rake spines that are divided into basal and apical groups (Fig. 283e). Length of hindtarsomere IV equal to apical width. Pygidial plate sparsely punctate, rounded or truncate apically (Fig. 283f), aciculate between punctures. Length 7.0–8.5 mm.

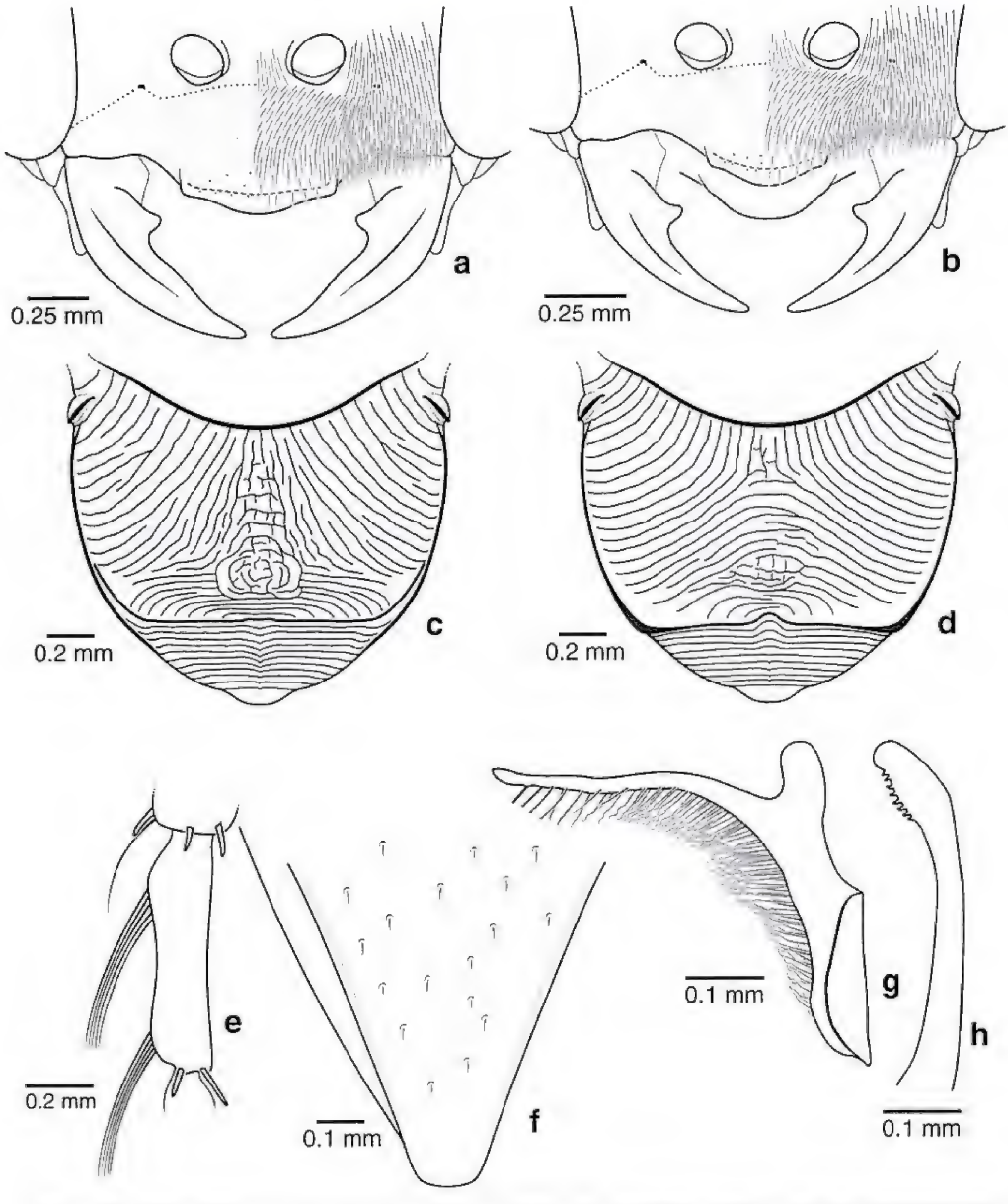


FIGURE 283. *Tachysphex plicosus* (A. Costa): a – female clypeus and mandible; b – male clypeus and mandible with outline showing variation of clypeal free margin; c – propodeal dorsum showing sculpture; d – propodeal dorsum of a different specimen; e – female forebasitarsus; f – pygidial plate of female; g – volsella; h – penis valve.

♂.— Mandible: trimmal carina with conspicuous tooth, without cleft (Fig. 283b), reduced, obtuse just distad of tooth. Clypeus (Fig. 283b): bevel ill defined but shorter than basomedian area, delimited laterally by obtuse carina that emerges from lip corner (carina absent in smallest specimens); lip free margin arcuate, with well-developed corner in most specimens, but corner absent in single male from Morocco (here forming single curved line with rest of clypeal margin). Width of

postocellar area 2.2–2.4 × length. Dorsal length of flagellomere I 1.5–1.8 × apical width. Forefemoral notch markedly expanded on anterior face, bottom compressed into glabrous crest (Figs. 284a–c). Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Sterna shiny, sternum II (except basally) and following with fine punctures that are many diameters apart; apical margin of sterna III and IV concave. Length 6.0–7.5 mm. Volsella and penis valve: Figs. 283g, h.

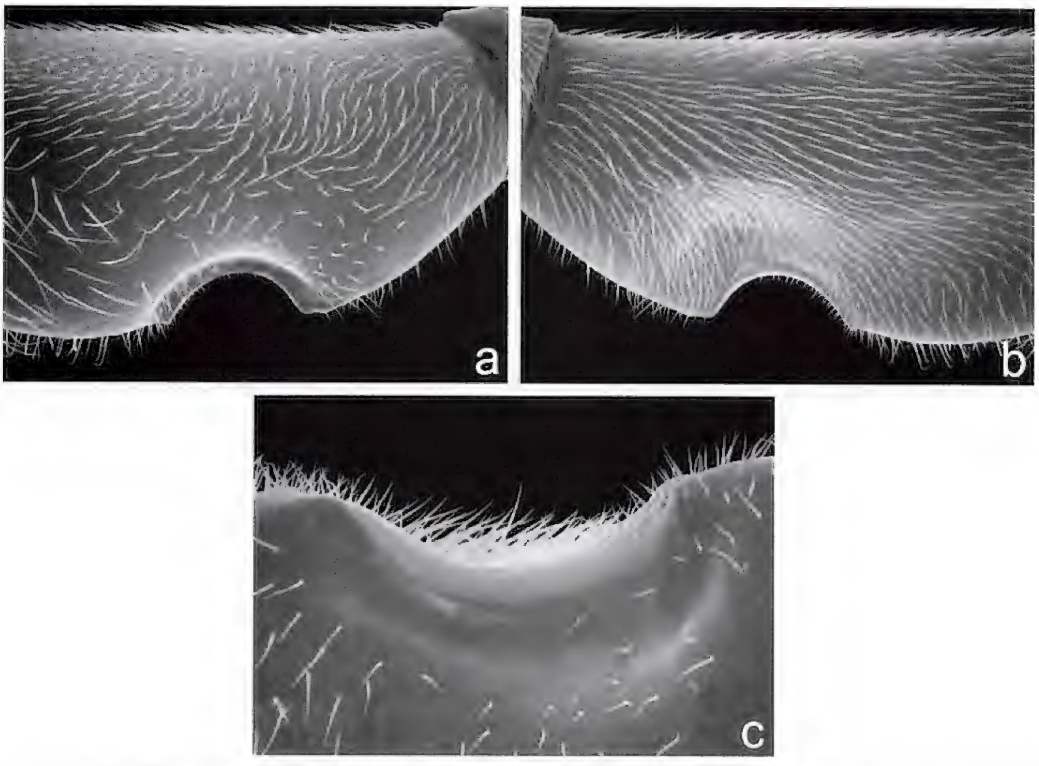


FIGURE 284. *Tachysphex plicosus* (A. Costa): a – basal portion of male forefemur showing notch, outer side (×101); b – basal portion of male forefemur showing notch, inner side (×101); c – male forefemoral notch at a higher magnification (×268).

NESTING BEHAVIOR.— Pulawski (1974b) observed nesting behavior of *plicosus* in Bulgaria, and Evans (1974) described the larva. Nests are established in pre-existing cavities in the soil, such as abandoned nests of other aculeate Hymenoptera. Prey consists mainly of nymphal tree crickets *Oecanthus pellucens* Scopoli, but also nymphal tettigoniids *Phaneroptera nana* Fieber.

GEOGRAPHIC DISTRIBUTION (Fig. 285).— Africa, Europe north to southern France and Romania, Turkey, Azerbaijan, India, Sri Lanka, and Thailand.

RECORDS.— **ALBANIA**: Kopliku (Guiglia, 1943a). **AZERBAIJAN**: Zakataly (Pulawski, 1971). **BENIN**: Cove at Zou River (1 ♂, OÖLM), 15 km SE Savé (1 ♀, OÖLM). **BULGARIA**: Vlado Trychkov 25 km N Sofia (8 ♀, 10 ♂). **BURKINA FASO**: Bobo Dioulasso (1 ♀, FSAG), Kompienga 20 km S Pama (2 ♀; 7 ♀, LEM). **BURUNDI**: Mosso de Ruyigi; Nuabitare (1 ♀, MRAC). **CAMEROON**: Bamenda (1 ♀, BMNH). **CROATIA**: Grižane near Crikvenica (Pulawski, 1971). **CYPRUS**: Yermasoyia (1 ♂). **EGYPT** (de Beaumont, 1940, or as indicated): **Al Fayyum**: Kom Osheim (1 ♀, FSCA). **Al Qahirah** (= Cairo): Ezbet el Nakhl, Marg. **Al-Uqsur** (= Luxor): 15 km S Luxor (1 ♂, CSE). **FRANCE** (from Bitsch et al., 2001, or as indicated): **Alpes Maritimes**: Cros-de-Cagnes (Pulawski, 1971). **Bouches-du-Rhône**: Marseille (Kohl, 1883a). **Corse**:

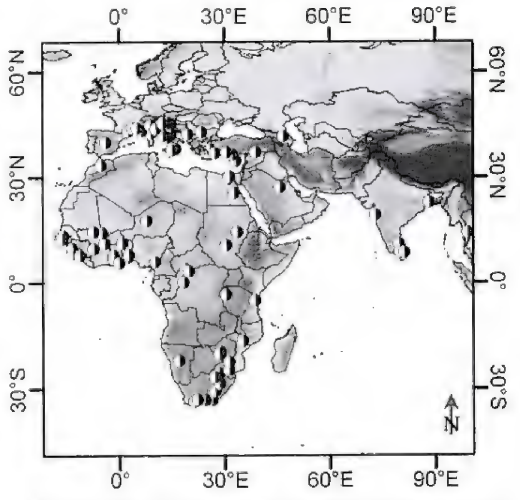


FIGURE 285. Collecting localities of *Tachysphex plicosus*.

Ghiarghia, Zilia. **Gard**: Saint-André-de-Majencoules. **Var**: Gonfaron. **Vaucluse**: Carpentras (Pulawski, 1971). **GAMBIA**: near Abuko Nature Reserve (1 ♀, ZMLU), Keneba (1 ♀, BMNH). **GHANA**: 30 km N Kintampo (1 ♀), Kumasi (1 ♀, BMNH), Labadi (Arnold, 1951). **GREECE**: **Dodecánisos**: Kos Island (de Beaumont, 1947a). **GUINEA**: Dubréka (1 ♀, PMA). **INDIA**: **Maharashtra**: Krishnaghiri Upavan National Park 12 air km NNW Bombay International Airport (1 ♀). **Tamil Nadu**: Karikal (1 ♀, FSAG). **West Bengal**: Barrackpore 20 km N Calcutta (1 ♀, OXUM, holotype of *striolatus*). **ITALY**: **Abruzzi**: Vasto Marina (Pagliano, 1980). **Calabria**: Vallata dell'Aspromonte (1 ♀, NAPOLI, holotype of *plicosus*). **Emilia-Romagna**: Bologna (de Beaumont, 1954), Ronzano (Grandi, 1937). **Friuli–Venezia Giulia**: Trieste (de Beaumont, 1947a). **Lazio**: Pontecorvo (de Beaumont, 1954), Sasso Furbara (Pulawski, 1971). **Piemonte**: Cassano Spinola (Gayubo and Borsato, 1994). **Sicilia**: Monte Etna: Monte Sona, 1350 m (de Beaumont, 1959). **Toscana**: Molina di Quosa near Pisa (de Beaumont, 1954). **Veneto**: Lido di Venezia (Giordani Soika, 1939). **IVORY COAST**: Bouaké: Foro-foro (1 ♀, 1 ♂; 28 ♀, 6 ♂, UCD). **MALAWI**: Chiromo (1 ♀, BMNH). **MALI**: Diafarabé (Arnold, 1951, as Tillembeya), Mourdiah (1 ♀, BMNH). **MOROCCO**: Azrou in Moyen Atlas (2 ♂), Fès (1 ♀). **NAMIBIA**: **Okahandja District**: Okahandja (1 ♀, H.N. Empey collection, now AMG). **NIGER**: 90 km N Agadez at 17°37′N 7°40′E (1 ♀, FSAG). **ROMANIA**: Gugesti (Pulawski, 1971). **SENEGAL**: Diémbéreng in Casamance Province (1 ♀, CSE), Zinguinchor (1 ♀, ZMAN). **SIERRA LEONE**: Freetown (1 ♀, AEI), Kambui Hills (1 ♀, AEI). **SOUTH AFRICA**: **Eastern Cape Province**: Aliwal North (1 ♀, PPRI), 18 km WNW Grahamstown: Hilton Farm (1 ♀, AMG), Lady Grey (1 ♀, SAM), 6 km N Steytlerville (1 ♀; 1 ♀ USU), 37 km NW Willowmore in Grootrivierberg Range at 33°11.5′S 24°09.5′E (1 ♀, USU). **Free State**: Abdullam Farm near Clarens at 28°34′S 28°28′E (1 ♀, PPRI). **Gauteng**: Johannesburg (1 ♀, AMG), Pretoria (1 ♀, 1 ♂, PPRI), Roodeplaat (2 ♀, PPRI). **Northern Province**: Guernsey Farm 15 km E Klaserie (1 ♀, PMA), Pafuri in Kruger National Park (1 ♀, PPRI). **North-West Province**: Potchefstroom at 26°42′S 27°06′E (1 ♂, AMG). **Western Cape Province**: Little Karoo SE Groot River (2 ♂, OÖLM), Tierberg Farm (2 ♀, AMG). **SPAIN** (Gayubo, Gonzáles, Tormos, and Asís, 2002): **Toledo**: Las Vegas near Talavera de la Reina, Mocejón. **SRI LANKA**: **Mannar District**: 0.5 mi NE Kokmotte Bungalow in Wilpattu National Park (1 ♀), Kondachchi(1 ♀,USNM). **Trincomalee District**: China Bay Ridge Bungalow (2 ♀, CAS, USNM). **SUDAN**: Talodi (1 ♀, BMNH), Wadi Medani (Pulawski, 1971). **TANZANIA**: **Tanga Region**: Amani in Usumbara Mts. (1 ♀; 2 ♀, ZMUC). **THAILAND**: **Kanchanaburi**: Lam Ta Pen River 5 km NW Lat Ya (1 ♀). **TURKEY**: **Antalya**: Demirtas (Hensen and van Ooijen, 1987), Termessos (1 ♀, CSE). **Urfa**: Urfa (Pulawski, 1971). **ZAIRE**: **Equateur**: Boketa (1 ♀, 1 ♂, FSAG), Eala (1 ♀, FSAG), Gemena (3 ♀, 1 ♂, FSAG). **ZIMBABWE**: Bulawayo (1 ♀, 1 ♂ holotype of *egregius*, SAM), Lonely Mine (1 ♀, BMNH), Redbank (1 ♂, SAM).

Tachysphex priesneri de Beaumont

Figures 286–288.

Tachysphex priesneri de Beaumont, 1940:176, ♀, ♂. Holotype: ♀, Egypt: Kharga oasis (Ministry of Agriculture of Egypt, Cairo), not examined.— Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:208 (in revision of Egyptian *Tachysphex*), 1956a:199 (Libya; variation); Pulawski, 1971:132 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:276 (listed).

RECOGNITION.— *Tachysphex priesneri*, an all black species with a flat labrum, has erect setae

on the basal declivity of tergum I and a concave, unusually wide postocellar area (Figs. 286c, d): width 1.7–2.3 × length in female, 2.4–2.6 in male. Long, conspicuous setae on the postocellar area (Figs. 286c, d), gena, thorax, and femoral venters (Fig. 287a) help in recognition, as does the pointed clypeal lip in the male (Fig. 286f).

Description.— Mandible: outer ridge somewhat swollen and expanded over notch. Postocellar area concave (Figs. 286c, d). Gena narrow as seen from above (Figs. 286a, b). Scutal punctures several to many diameters apart on disk (interspaces shiny), no more than one diameter apart near margins. Mesopleuron dull, rugose in most specimens, but with shallow, ill-defined punctures in those from Anefis, Mali. Propodeal dorsum irregularly ridged to rugose, side ridged to

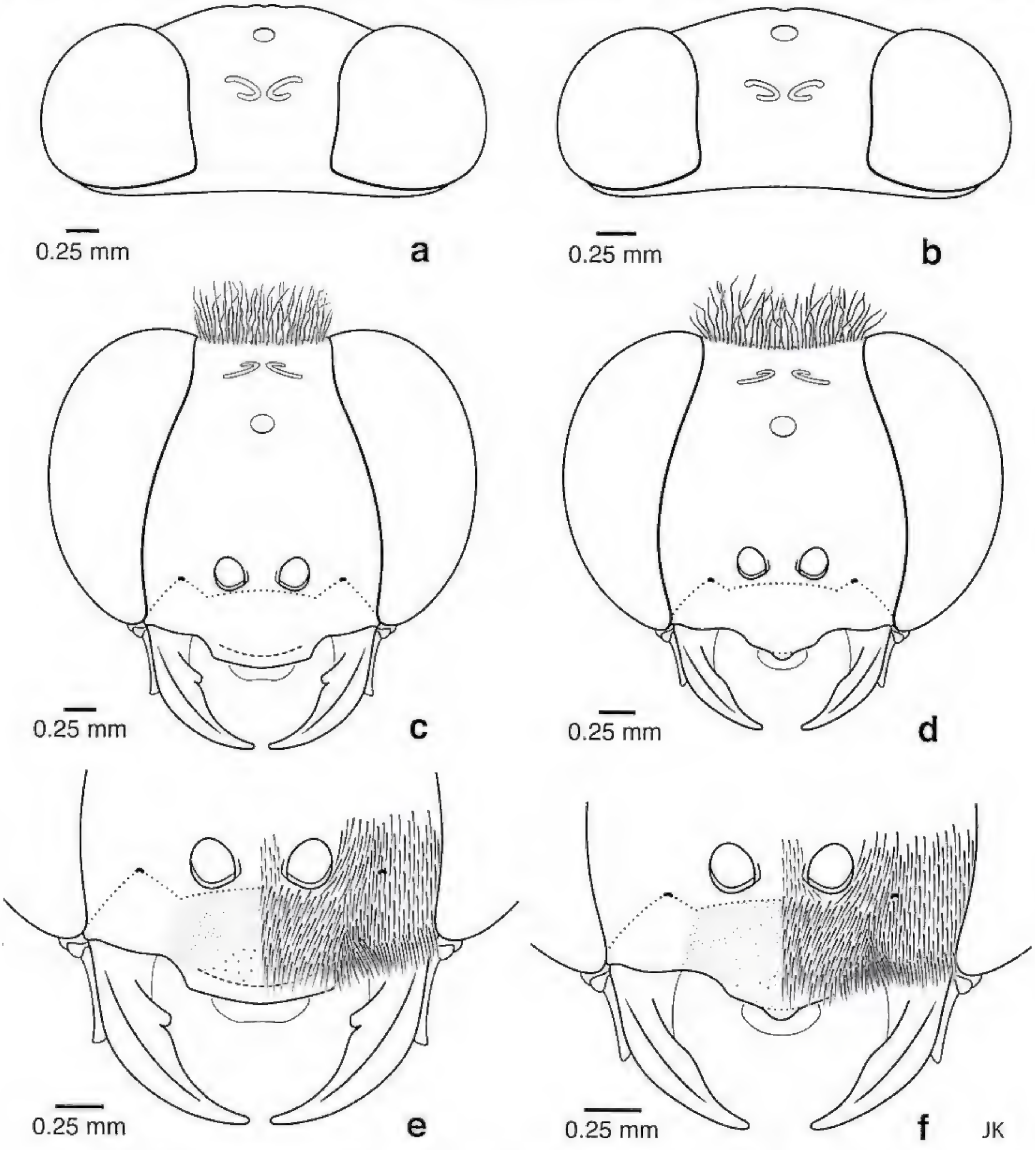


Figure 286. *Tachysphex priesneri* de Beaumont: a – female head in dorsal view; b – male head in dorsal view; c – female head in frontal view; d – male head in frontal view; e – female clypeus and mandible; f – male clypeus and mandible.

irregularly reticulate. Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Hindwing jugal lobe larger than average for the genus. Sternum I in many specimens with ill-defined median carina over its entire length.

Setae erect and slightly sinuous on postocellar area (Figs. 286c, d), lower gena, scape, pedicel, thorax, femoral venters (Fig. 287a), and basal declivity of tergum I; oriented anterolaterad on propodeal dorsum, not concealing integument. Setal length expressed as a fraction of basal mandibular width: 0.7–0.8 on postocellar area, 0.9 on each side of oral fossa next to occipital carina, up to 0.7 on midfemoral venter and tergum I.

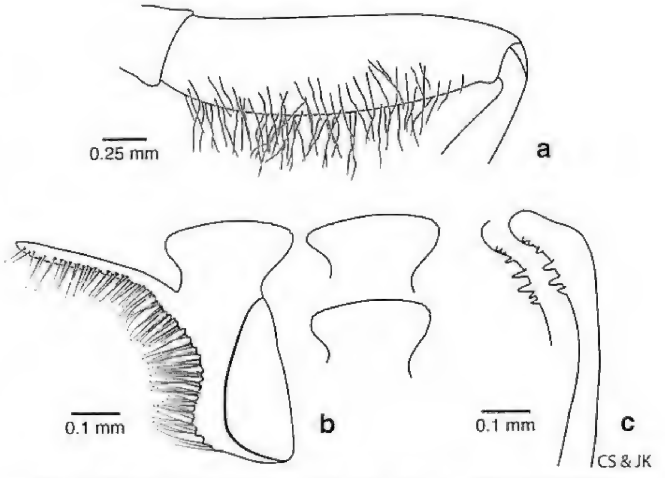


FIGURE 287. *Tachysphex priesneri* de Beaumont: a – female midfemur; b – volsella with outlines showing variation; c – penis valve.

Head, thorax, legs, and gaster black except mandible reddish mesally in some specimens. Frontal setae silvery in both sexes. Wing membrane almost hyaline, costal vein of forewing brown, subcostal vein dark brown to black. Terga I–III (I–IV in some males) silvery fasciate apically, fasciae interrupted mesally.

♀.— Clypeus (Fig. 286e): middle section flat, bevel ill defined or absent; lip free margin arcuate, not incised laterally. Width of postocellar area 1.7–2.3 × length. Dorsal length of flagellomere I 2.6–3.0 × apical width. Forefemoral venter: punctures several diameters apart, interspaces shiny in basal half. Dorsal foretibial surface with one to three spines; outer surface with two preapical spines. Forebasitarsus with 7–9 rake spines. Trochanteral venters shiny, impunctate. Venter of hindtarsomere V, in some specimens, with spine near midlength. Apical depression of tergum V impunctate. Length 8.5–12.0 mm.

♂.— Mandible: trimmal carina without tooth or cleft (Fig. 286f). Clypeus (Fig. 286f): middle section flat, bevel ill defined or absent; lip free margin obtusely to acutely pointed (concave on each side of median point in some specimens), corner ill defined or absent; distance between corners 0.8 × distance between corner and orbit. Width of postocellar area 2.4–2.6 × length. Dorsal length of flagellomere I 1.6–1.9 × apical width. Forefemoral notch shiny, with evanescent, sparse microsetae. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sternal punctures up to several diameters apart apicomesally. Length 5.0–9.0 mm. Volsella and penis valve: Figs. 287b, c.

GEOGRAPHIC DISTRIBUTION (Fig. 288).— Mali to Pakistan, north to Tripolitania and Sinai.

RECORDS.— **ALGERIA**: southern Algeria: no specific locality (de Beaumont, 1940). **EGYPT**: **Al Jizah** (= Ghiza): Wadi um Assaad near Abu Rawash (de Beaumont, 1940). **Al Qahirah** (= Cairo): Katamia area 40 km E Maadi (1 ♀, 2 ♂). **Al-Wadi al-Jadid**: Dakhla oasis: Balat (1 ♂, ZMAN), Dakhla oasis: Ewina (1 ♂, ZMAN), Dakhla oasis: Mut (2 ♀, 7 ♂; 6 ♀, 22 ♂, ZMAN). **Sina** (= Sinai): Nakhl (6 ♀), 65 air km E Suez (1 ♂, MSNT), Wadi Gharandal 30 km NW Abu Zenima (1 ♀, 2 ♂), Wadi Sudr 50 air km SE Suez (1 ♂). **ISRAEL**: Moshaav Hazeva at 30°46′33″N 35°16′32″E (1 ♂, CSE). **LIBYA**: **Fezzan**: Mendib 85 km SE El Fogaha (1 ♀), Mourzouk (de Beaumont, 1956a). **Tripolitania**: Hon oasis (3 ♂), Zella oasis (de Beaumont, 1956a). **MALI**: Anefis (1 ♀, 1 ♂, KMG). **PAKISTAN**: Peshin (2 ♀, 1 ♂; 1 ♀, BMNH).

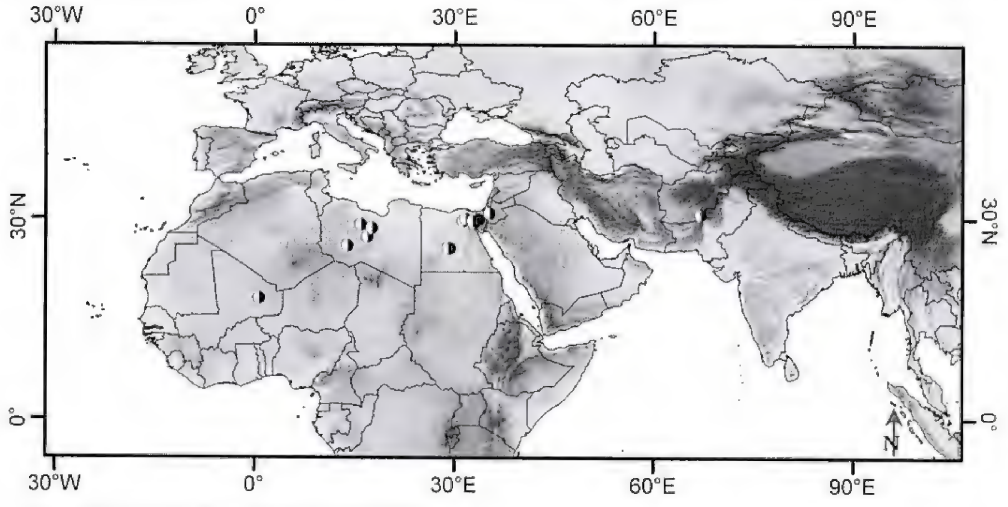


FIGURE 288. Collecting localities of *Tachysphex priesneri*.

Tachysphex prosopigastroides Bischoff

Figures 289–292.

Tachysphex prosopigastroides Bischoff, 1913b:65, ♀. Holotype: ♀, Zimbabwe: Bulawayo (ZMHU), examined.— Arnold, 1923:163 (in revision of southern African *Tachysphex*), 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:276 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex subfuscatus R. Turner, 1917a:323, ♀. Holotype: ♀, Malawi: Mlanje (BMNH), examined. **New synonym.**— Arnold, 1923:176 (original description copied), 1930:4 (in checklist of Afrotropical Sphecidae); Pulawski, 1975:313 (diagnostic characters); Bohart and Menke, 1976:277 (listed).

Tachysphex strigatus R. Turner, 1917a:324, ♀. Lectotype: ♀, Zambia: between Chipata and Lundazi (BMNH), designated by Pulawski, 1975:313, examined. Synonymized with *Tachysphex subfuscatus* by Pulawski, 1975:313.— Arnold, 1923:174 (original description copied), 1930:4 (in checklist of Afrotropical Sphecidae).

Tachysphex sipapomae Arnold, 1923:164, ♂. Lectotype: ♂, Zimbabwe: Sawmills (SAM), **here designated**, examined. Synonymized with *Tachysphex prosopigastroides* by Arnold, 1924:70.

RECOGNITION.— *Tachysphex prosopigastroides* resembles *schmiedeknechti* in having a coarsely punctatorugose scutum and mesopleuron; erect, sinuous setae on the head, thorax, and femora; and female flagellomeres IV–X flattened laterally, with a well-defined ventral edge. (Figs. 290a-c) Unlike *schmiedeknechti*, the rays of the inner hindtibial spur are usual, closely spaced; and the free margin of the clypeal lip has a median notch and three pairs of obtuse teeth in the female (Fig. 289a) and a median, obtuse projection in the male (Fig. 289b). In *schmiedeknechti*, the inner hindtibial spur consists of the unusually thickened, sparsely spaced rays (Fig. 343b) and the free margin of the clypeal lobe is arcuate in both sexes (Figs. 342a, b).

JUSTIFICATION OF NEW SYNONYMY.— The holotypes of *prosopigastroides* and *subfuscatus* are certainly conspecific. These two names are therefore synonyms.

DESCRIPTION.— Supraantennal swelling higher than average for the genus, roundly triangular in profile (Fig. 289c). Scutum and mesopleuron coarsely punctatorugose. Propodeal dorsum and posterior surface ridged to irregularly rugose, side ridged; posterior surface, in dorsal third or so, with wide median impression. Hindcoxal dorsum with inner margin carinate basally, carina convex. Apical depression of sternum I bisected by longitudinal, obtuse carina.

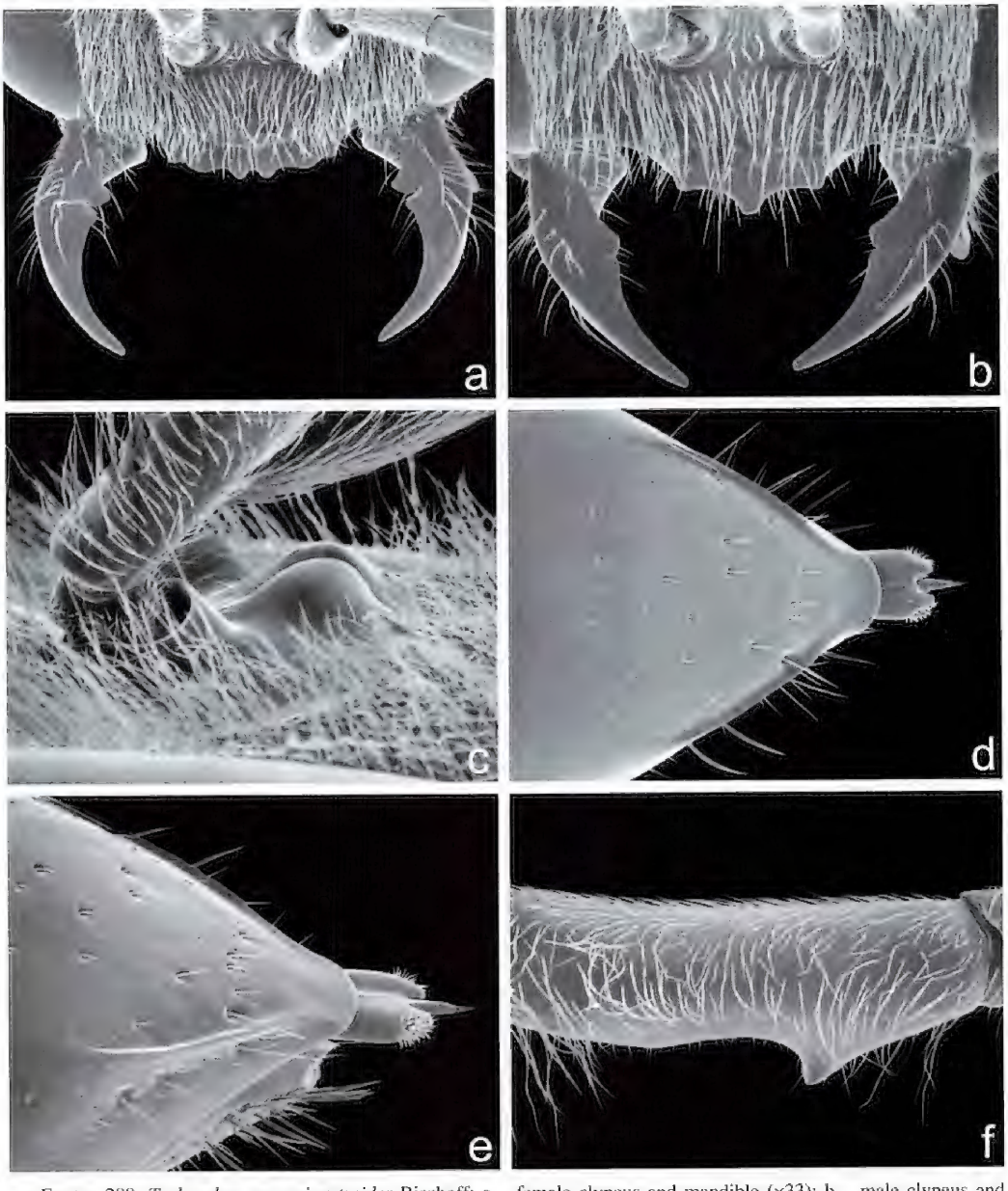


FIGURE 289. *Tachysphex prosopigastroides* Bischoff: a – female clypeus and mandible (×33); b – male clypeus and mandible (×60); c – supraantennal swelling of female in lateral view (×102); d – pygidial plate of female in dorsal view (×72); e – same in lateral oblique view (×90); f – base of male forefemur (×90).

Setae sinuous and suberect to erect on postocellar area, lower gena, thorax, fore- and mid-femoral venter; suberect on hindfemoral venter; not concealing integument; on propodeal dorsum oriented anterad near foremargin, oriented posterad near hindmargin; longest setae (e.g., those on lower gena and propodeal dorsum) equal to 0.7–0.8 of basal mandibular width.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in

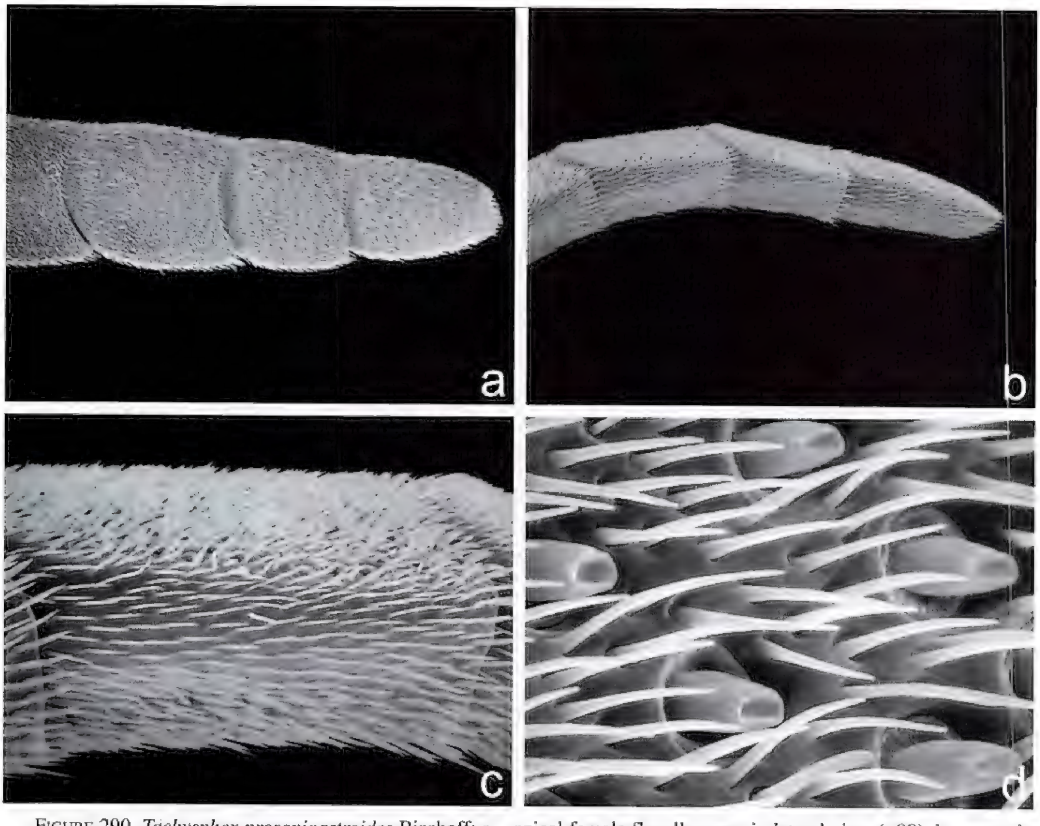


FIGURE 290. *Tachysphex prosopigastroides* Bischoff: a – apical female flagellomeres in lateral view (×90); b – same in dorsal view (×90); c – female flagellomere IX in dorsal view (×300); d – surface of female flagellomere IX at high magnification (×1800).

male. Wing membrane slightly infumate, markedly so in some females; forewing costal and subcostal veins brown. Color of legs and gaster: see below. Terga I–III (I–IV in many males) silvery fasciate apically.

♀.— Clypeus flat, bevel not differentiated, punctures of medioventral area varying from less than one to several diameters apart; lip with median notch and two lateral emarginations on each side (Fig. 289a), i.e., with three pairs of obtuse teeth (teeth partly confluent in some specimens). Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width; flagellomeres IV–X flattened laterally (dorsal length of flagellomere V 1.2–1.3 × maximum width), with well-defined ventral edge, and inner and outer surfaces differently sculptured (Figs. 290a-d). Forefemoral venter shiny, with minute punctures that are several diameters apart. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with 6–8 rake spines; outer apical spine of mid- and hindtarsomeres IV reaching claw base. Venters of hindtarsomeres V each with two or three spines along midline or a pair of spines basally and two spines along midline. Apical depression of tergum V unsculptured, asetose. Pygidial plate slightly constricted apically (Figs. 289d, e). Length 9.6–10.3 mm. Gaster all black (Zambian females) or segments I–III red. Legs black, apical tarsomeres reddish.

♂.— Mandible: trimmal carina with tooth that varies from well-defined to evanescent, with or without cleft. Clypeus flat, bevel not differentiated (Fig. 289b); lip free margin with obtuse, medi-

an projection and well-defined corner, concave between projection and corner; distance between corners about 0.9 × distance between corner and orbit. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere I 2.0–2.1 × apical width. Forefemoral notch glabrous, its proximal margin pointed and apical margin ill defined (Fig. 289f). Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II about as long as tarsomeres III and IV combined. Apical depressions of terga impunctate or nearly so. Punctures of tergum VII 1–2 to several diameters apart basally, but less than one diameter apart apically. Sterna III–VI largely glabrous. Length 7.3–10.0 mm. Volsella and penis valve: Fig. 291. Gaster red except tip black or brown. Legs all red or fore- and midfemora black (except apically) and hindfemur black basally.

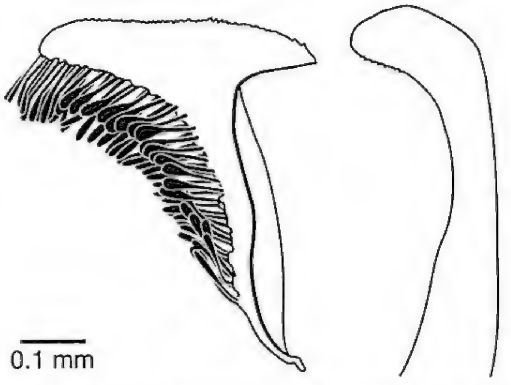


FIGURE 291. *Tachysphex prosopigastroides* Bischoff: volsella and penis valve.

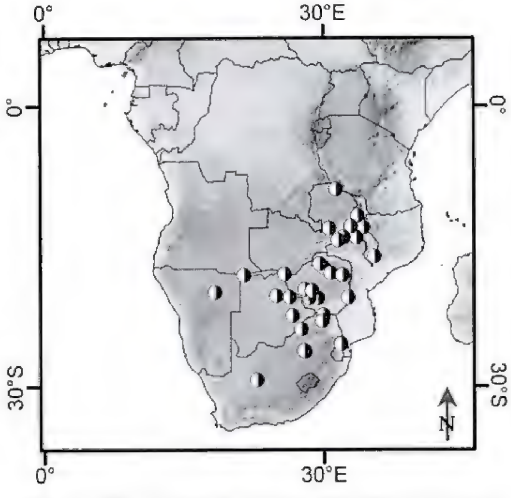


FIGURE 292. Collecting localities of *Tachysphex prosopigastroides*.

GEOGRAPHIC DISTRIBUTION (Fig. 292).— Northern Namibia to Malawi and northern South Africa.

RECORDS.— **BOTSWANA**: 25 mi W Gweta at 20°17′S 24°54′E (1 ♂, BMNH), Semowane River at 20°25′S 26°23′E (1 ♂, BMNH), Serowe (1 ♂). **MALAWI**: Kotakota (1 ♀, BMNH), Lilongwe District (1 ♀), Mlanje (1 ♀, BMNH, holotype of *subfuscatus*), Mombera District (1 ♀, SAM). **NAMIBIA**: **Grootfontein District**: Alexander 989 [Farm], SE 1918 Cd [= 19°45′–20°00′S 18°15′–18°30′E] (1 ♂, NMN). **Rundu District**: Andara (1 ♂, NMN). **SOUTH AFRICA**: **Gauteng**: Johannesburg: Mondeor Hills (1 ♀, AMG), Randburg (2 ♀, 1 ♂, AMG). **Mpumalanga**: Crocodile Bridge in Kruger National Park (3 ♂, PPRI), Komatipoort (1 ♀, PPRI). **Northern Cape Province**: Niekerkshoop in Griqualand (1 ♀, 1 ♂, SAM). **Northern Province**: Afguns (1 ♂, AMG), 2 mi N Messina (1 ♂), "N.E. Zoutp. dist." [probably NE Zoutpansberg near Louis Trichard] (1 ♀, 2 ♂, TMP). **ZAMBIA**: **Eastern Province:** 60 km SW Chipata (1 ♂), between Chipata and Lundazi (1 ♀, BMNH, lectotype of *strigatus*), 32 km E Petauke (2 ♀, 6 ♂; 1 ♂, MSNT). **Northern Province**: Mbala (1 ♀, AMG), 65 road km NE Serenje (1 ♂). **ZIMBABWE**: Bulawayo (1 ♂, AMG; 1 ♂, PPRI; 6 ♀, SAM; 1 ♀, 3 ♂, TMP; 1 ♀, ZMHU, holotype of *prosopigastroides*), Bulawayo airport (3 ♀, 8 ♂; 5 ♂, NHMZ), Bulawayo: Forest Valley (1 ♂, TMP), 15 km NW Chinhoyi = Sinoia (1 ♂), Filabusi: Druid Mine (1 ♀, TMP), Kami Ruins (10 ♀, 10 ♂; 1 ♂, AMNH; 3 ♀, NHMZ; 4 ♀, SAM; 1 ♀, 1 ♂, TMP), Karoi (1 ♂, AMG), Lion and Cheetah Park 24 km W Harare (1 ♂), Matobo: World's View (1 ♀, SAM), Mt. Selinda (1 ♀, ANSP), Nyamandhlovu (1 ♀, SAM), 11 km NE Nyamandhlovu (1 ♀, 4 ♂), Redbank at Kami River (1 ♂; 1 ♂, NHMZ; 1 ♀, SAM), Sawmills (1 ♂, ANSP; 1 ♀, CU; 1 ♂, PPRI; 2 ♀, 1 ♂, SAM, lectotype of *sipapomae*; 1 ♀, 1 ♂, TMP; 1 ♂, ZMLU), St. Benedict 30 km NE Macheke (1 ♀, 1 ♂, JG), Turk Mine (1 ♀, SAM), Victoria Falls (2 ♀, 2 ♂; 1 ♂, NHMZ).

***Tachysphex pseudofasciatus* Pulawski, sp. nov.**
Figures 293, 294.

As *Tachysphex fasciatus*, **present correction**: de Beaumont, 1940:178 (in revision of Egyptian *Tachysphex*); de Beaumont, 1947a:207 (in revision of Egyptian *Tachysphex*; ♂ = *Tachysphex speciosissimus*); Pulawski, 1971:118 (in revision of Palearctic *Tachysphex*).

Recognition.— *Tachysphex pseudofasciatus* has the postocellar area broad (Figs. 293a, b): width 1.5–1.7 × length in female, 1.8 × in the male, and the propodeal side not ridged. Also, the setae are erect but no longer than midocellar diameter on the postocellar area (Figs. 293a, b), appressed on the scutum and the midfemoral venter; and the entire propodeal side is setose. The gaster is black except for the contrastingly yellowish brown apical depressions of terga, and the tibiae are red.

The female can be recognized by an obtusely pointed clypeal lip (Fig. 293c). As in *ramses* and unlike the other species, the inner mandibular margin has no tooth or cleft (Fig. 293c); in *pseudofasciatus*, however, the labrum is flat and hidden under the clypeus, whereas conspicuously convex and protruding from beneath the clypeus in *ramses*.

The male can be recognized, in addition to the above characters, by the structure of its clypeus whose bevel has a lateral tubercle on each side and whose lip is somewhat prominent mesally, with the free margin slightly concave on each side of the midpoint (Fig. 293d).

Description.— Scutal punctures well defined, on disk about one to several diameters apart; interspaces unsculptured. Mesopleural punctures evanescent, many diameters apart in African specimens, in those from Israel relatively well defined, one diameter apart near center; interspaces microsculptured, dull. Propodeal dorsum evenly microareolate or partly with irregular microridges; side evenly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, about as long as midocellar diameter (Figs. 293a, b), appressed on scutum; suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; appressed or nearly so on midfemoral venter; diverging anterad from midline on propodeal dorsum. Propodeal side setose throughout.

Head and thorax black, mandible yellowish red mesally. Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal vein of forewing yellowish brown, subcostal vein brown. Femora red except black basally in African specimens, but fore- and midfemora all black (red at very apex) and hindfemur black in basal half or so in those from Israel; tibiae and tarsi red. Gaster black, apical depressions of terga contrastingly yellowish brown. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 293c): bevel shorter than basomedian area; lip free margin obtusely pointed, not incised laterally. Width of postocellar area about 1.5–1.7 × length (Fig. 293a). Dorsal length of flagellomere I 1.5–1.6 × apical width. Dorsal foretibial surface with two spines; outer surface with one or two spines. Forebasitarsus with six to nine rake spines (of which at least three are apical). Tergum V with minute punctures that are many diameters apart, apical depression impunctate, glabrous. Pygidial plate with fine punctures that are many diameters apart (several punctures close to each other near margin); interspaces unsculptured. Length 7.1–8.1 mm.

♂.— Mandible: trimmal carina evenly curved, without trace of tooth or cleft. Clypeus (Fig. 293d): bevel about as long as basomedian area, with obtuse tubercle on each side next to clypeal foremargin; distance between tubercles 1.3 × distance between corner and orbit; lip indistinctly delimited from bevel, with free margin arcuate, obtusely pointed mesally, with obtuse corner; distance between corners equal to 1.1 × distance between corner and orbit. Width of postocellar area 1.8 × length (Fig. 293b). Dorsal length of flagellomere I 1.4 × apical width. Forefemoral notch

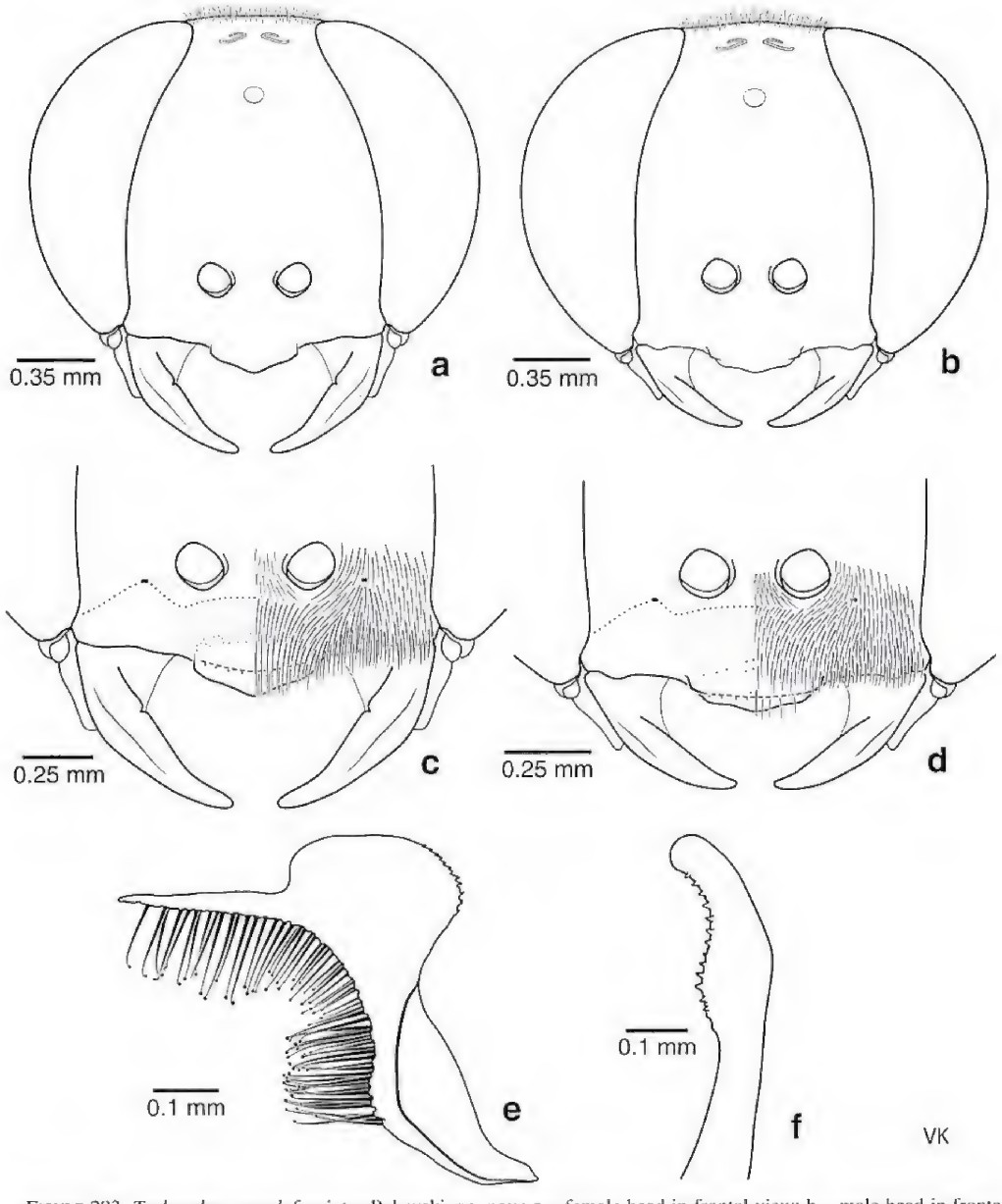


FIGURE 293. *Tachysphex pseudofasciatus* Pulawski, sp. nov.: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella; f – penis valve.

microscopically setose. Outer margin of forebasitarsus with six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Length 7.5 mm. Volsella and penis valve: Figs. 293e, f.

GEOGRAPHIC DISTRIBUTION (Fig. 294).— Algeria, Tunisia, Egypt, Israel.

RECORDS.— HOLOTYPE: ♀, **EGYPT**: **Al Qahirah** (= Cairo): Gebel Asfar, 14 Apr 1935, ex A. Alfieri collection (USNM). PARATYPES: **ISRAEL**: Hazeva Field School in Arava Valley, M.E. Irwin, 7 April 1995

(1 ♀, CSE), 8 April 1995 (1 ♀). **TUNISIA**: 15 km W Nefta at 33°50′N 7°43′E, 11 May 2001, Rosa (1 ♂).

Also recorded from Biskra, Algeria, by de Beaumont (1947a).

Tachysphex psilonotus Pulawski, sp. nov.

Figures 294, 295.

Derivation of name.— *Psilonotus* is derived from two Greek words: *psilos*, bald; and *noton* or *notos*, back, ridge; with reference to the partly glabrous propodeal dorsum of this species.

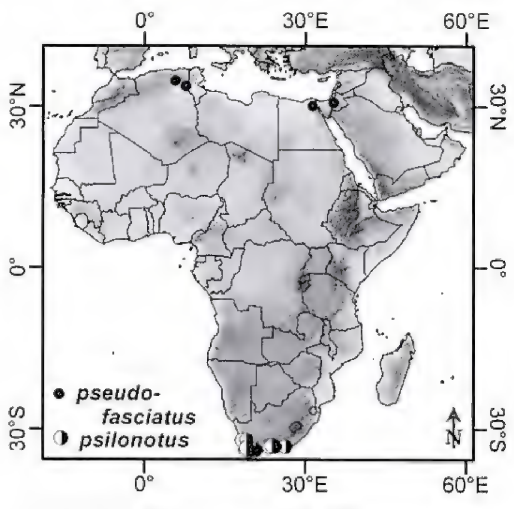


Figure 294. Collecting localities of *Tachysphex pseudofasciatus* and *psilonotus*.

Recognition.— *Tachysphex psilonotus* is known from a few localities between Grahamstown and Cape Town, South Africa. It has a convex labrum that protrudes from beneath the clypeus, a galea almost as long as the scape, a propodeal dorsum that is asetose at least apicomesally, and an all black gaster. This combination is shared with *claripes*, *diabolicus*, and *lacertosus*. In *psilonotus*, however, the forewing subcostal vein is dark brown to brown (reddish in *lacertosus* and some *claripes*), the galea sparsely punctate (closely micropunctate except anteriorly in *lacertosus*), setae of the episcrobal area erect or nearly so and at least as long as midocellar diameter (nearly appressed in *lacertosus*), terga I–III each with a silvery fascia (terga not fasciate in *diabolicus*), and in the female the outer foretibial surface is asetose or sparsely setose (foretibia uniformly, densely setose in *lacertosus*). The male is easily distinguished from the other three species by its arcuate clypeal lip, with the corner ill defined or absent, and a nondentate trimmal carina (Fig. 295b). The female, morphologically identical to *claripes* (which ranges from Namibia and Zimbabwe to South Africa), can be identified only by association with the topotypical males.

Sex association.— I regard as conspecific the females and males collected by M.E. Irwin, E.I. Schlinger, and F.D. Parker in 1999 (some of them in the same locality), because no male of *claripes* was collected during their expedition.

Description.— Labrum convex and protruding from beneath clypeus (but less so than in *panzeri* or *pentheri*), its free margin only slightly arcuate mesally. Galea sparsely punctate (punctures several diameters apart), as long as 0.9 of scape. Scutal punctures minute, averaging one diameter apart or less. Mesopleuron dull, uniformly microsculptured. Propodeal dorsum evenly microareolate; side finely ridged, but ridges partly reduced in most specimens, and all reduced in smallest male. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area, scutum, propodeal dorsum, and femora; most genal setae appressed, but erect on each side of oral fossa next to occipital carina (setal length about one midocellar diameter); oriented posterad on propodeal dorsum except for large glabrous apicomedian area (all dorsum glabrous in some specimens).

Head, thorax, and gaster black, mandible reddish mesally. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate; forewing costal vein dark brown and subcostal vein black in specimens from Wellington, but reddish brown and brown, respectively, in single male from Tulbagh. Leg coloration: see below. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 295a): bevel longer than basomedian area; lip free margin arcuate, without

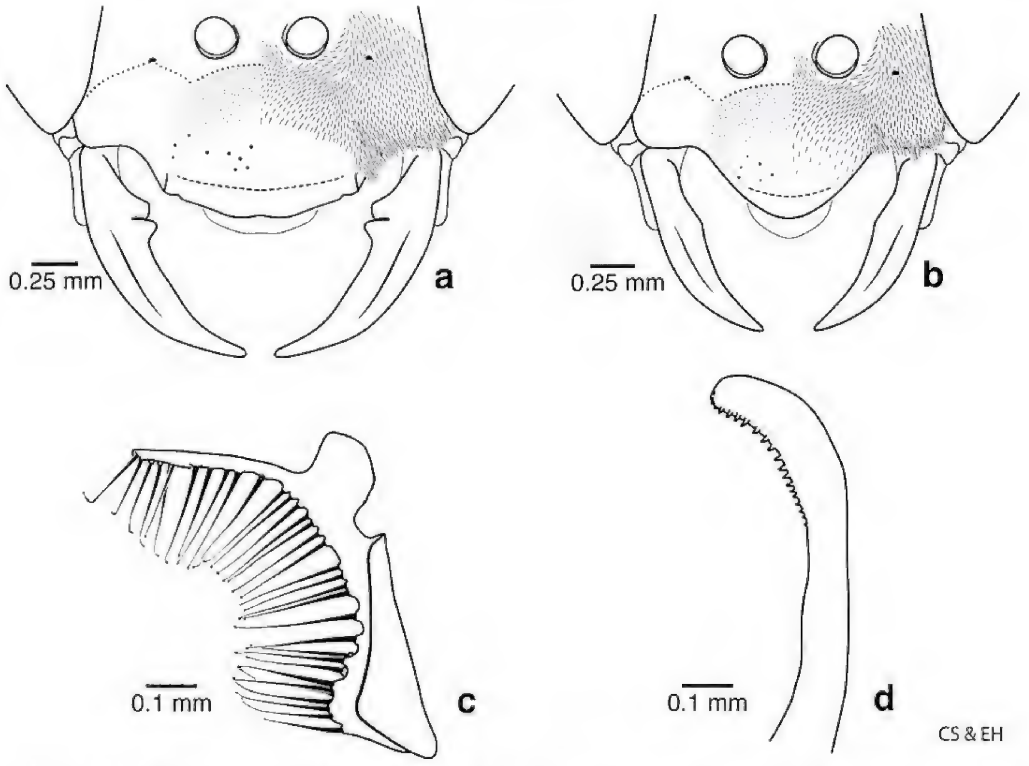


FIGURE 295. *Tachysphex psilonotus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

median notch, incised or sinuous laterally. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.4–2.5 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines, asetose or sparsely setose; midtibia with asetose dorsal zone. Forebasitarsus with seven or eight rake spines. Tergum V densely micropunctate and setose, including apical depression. Length 9.2–13.4 mm. Legs varying from mostly red to mostly black. In lightest specimens, red are: forefemoral apex, distal half of midfemur, hindfemur (except basally), tibiae, and tarsi. In darkest specimen (one female): femora and tibiae black except inner foretibial surface and midtibial venter reddish; tarsi brown.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 295b): bevel shorter than basomedian area; lip free margin obtusely pointed, with corner ill defined or absent; distance between corners 1.0–1.1 × distance between corner and orbit. Width of postocellar area 0.7–0.9 × length. Dorsal length of flagellomere I 1.4–1.8 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus mostly with four or five rake spines, but only three spines present on right tarsomere (next to its apex) in single male from Tulbagh; outer apical spine of foretarsomere II mostly longer than tarsomere III, but shorter in a male from Gooedehoop Farm. Apex of sternum VIII tridentate but middle tooth in some specimens rounded, low, ill defined. Length 8.0–10.4 mm. Volsella and penis valve: Figs. 295c, d. Femora black except red apically, tibiae and tarsi red.

GEOGRAPHIC DISTRIBUTION (Fig. 294).— Eastern Cape and Western Cape provinces of South Africa.

Records.— Holotype: ♂, **SOUTH AFRICA: Western Cape Province**: Wellington: Rooshoek, Dec 1973, P.M.F. Verhoeff (RMNH). Paratypes (ISP = M.E. Irwin, E.I Schlinger, and F.D. Parker): **SOUTH AFRICA: Eastern Cape Province**: Grootrivierberg Range 37 km NW Willowmore, 19–24 Nov 1999, ISP (5 ♂; 15 ♂, USU); Goodehoop Farm 16 km W Steytlerville, 19 Nov 1999, ISP (1 ♂, USU); Hilton Farm 18 km WNW Grahamstown, F.W. Gess, 18 Dec 1970 (1 ♂) and 19 Dec 1970 (1 ♂, AMG); 6 km N Steytlerville, 16–23 Nov 1999, ISP (3 ♀, 3 ♂; 6 ♀, 3 ♂, USU); 43 km NE Willowmore: Plessierivier, 18–22 Nov 1999, ISP (1 ♂, USU); 11 km SW Willowmore, 20–24 Nov 1999, ISP (1 ♀). **Western Cape Province**: same data as holotype (5 ♀, 4 ♂; 5 ♀, 4 ♂, RMNH); same data except 17–30 Nov 1973 (1 ♀, 1 ♂, RMNH); same locality, Dec 1959, A. Mirjam Verhoeff (1 ♂, RMNH); Barrydale, 16 Dec 2002, Marek Halada (2 ♂, OÖLM); 40 km E Clanwilliam: Sevilla, 27–28 Nov 1999, F.D. Parker (1 ♀); Greyton, 22 Nov 2002, Marek Halada (2 ♂, OÖLM); Jonkershoek near Stellenbosch, 25 Jan 1971, V. Whitehead (1 ♂, AEI); 5 km S Lambert's Bay, 20 Nov 2002, Marek Halada (1 ♂, OÖLM); Tulbagh, 8 Jan 1975, H. Empey (1 ♂, AMG).

Tachysphex ptah Pulawski

Figures 296, 297.

Tachysphex ptah Pulawski, 1964:84, ♀, ♂. Holotype: ♂, Egypt: Abu Rawash NW Cairo (CAS), examined.— Pulawski, 1971:287 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:10 (Israel); Bohart and Menke, 1976:276 (listed).

Recognition.— *Tachysphex ptah*, known from Egypt, Israel, and the Arabian Peninsula, is one of the many species in which the labrum is markedly convex and protruding beyond the clypeal margin. In addition, the propodeal side is not ridged, the postocellar area is markedly longer than wide, the setae are appressed on the postocellar area and straight (not sinuous) on the gena and thorax, oriented obliquely toward midline on the propodeal dorsum in the apical half or so, and terga I–III are silvery fasciate apically (but not tergum IV). In the female, tergum V is finely punctate and setose throughout, including the apical depression, and in the male the clypeal lip has a lateral corner, the outer apical spine of foretarsomere II is longer than tarsomere III, and the dorsal volsellar process is elongate (Fig. 296c).

A number of other species share this character combination, but the female of *ptah* differs in having the galea aciculate, with a few ill-defined microscopic punctures (rather than densely, finely micropunctate). Also, the mandibular notch is the usual size (unusually large in *buyssoni*), the setae shorter than one midocellar diameter on the gena (longer in *cheops* and in the northern populations of *calidus*), the tibiae are red (at least mid- and hindtibiae black in *georgii*), and tergum IV is not fasciate (fasciate in many *calidus* and many *panzeri*). Also similar is *Tachysphex mycerinus*, which has a distinctive pygidial plate (see that species, p. 432).

The male of *ptah* can be distinguished from similar species by its narrow, elongate forefemoral notch, with erect microscopic setae. Also distinctive are the galea (aciculate, with a few microscopic, ill-defined punctures) and the hindfemoral venter (inner margin well defined in distal half).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea dull, microreticulate and with a few ill-defined punctures, longer than wide in profile, as long as 1.2–1.3 of scape. Scutal punctures ill defined, about one diameter apart. Mesopleuron dull, evenly microrugose. Propodeal dorsum and side evenly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; suberect, almost as long as midocellar diameter, on each side of oral fossa next to occipital carina; forming a complicated pattern on propodeal dorsum: lateral setae oriented posterolaterad, adlateral setae oriented posteromesad and meeting apically, admedian setae oriented posteromesad in apical half or so and oriented anteromesad in basal third or so except those next to anterior margin inclined posterad.

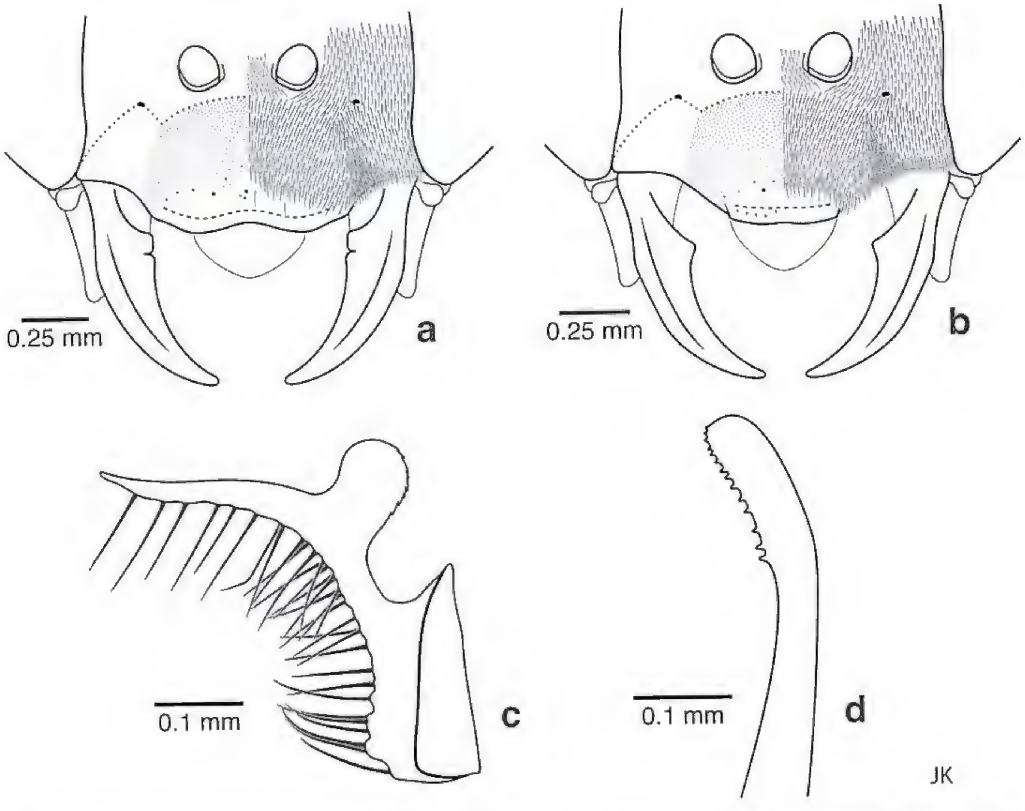


FIGURE 296. *Tachysphex ptah* Pulawski: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Head and thorax black, mandible yellowish red except apically (black basally in many males). Frontal setae silvery in both sexes. Wing membrane slightly yellowish to nearly hyaline; costal and subcostal veins of forewing yellowish brown or subcostal vein contrastingly brown. Femora in most specimens black basally and red apically (in varying proportions), tibiae and tarsi red, but in specimens from Israel femora black except narrowly red apically and female tibiae largely black. Gastral segments I–III red in most specimens (remainder black), but gaster nearly all black in specimens from Israel except for some reddish areas basally. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 296a): bevel as long as basomedian area or shorter; lip free margin arcuate, mesally straight or minimally, broadly concave, not incised laterally. Width of postocellar area 0.5–0.7 × length. Dorsal length of flagellomere I 2.0–2.6 × apical width. Dorsal foretibial surface with three spines; outer surface with one or two spines. Forebasitarsus with seven or eight rake spines. Apical spines of hindtarsomere IV almost reaching claw bases. Apical depression of tergum V microscopically punctate and setose. Pygidial plate with punctures that average several to many diameters apart; interspaces unsculptured or aciculate. Length 8.3–9.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 296b): bevel shorter than basomedian area, delimited laterally by short, obtuse carina emerging from lip corner; lip free margin evenly, slightly arcuate or shallowly, broadly concave mesally, with well-defined corner; distance between corners 0.9–1.3 × distance between corner and orbit. Width of postocellar area

0.8–0.9 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Forefemoral notch narrow, glabrous. Outer margin of forebasitarsus with 3–5 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin well defined in distal half. Length 5.2–7.7 mm. Volsella and penis valve: Figs. 296c, d.

Geographic distribution (Fig. 297).— Lower Egypt, Israel, Yemen.

Records.— EGYPT: Al Jizah (= Ghiza): Abu Rawash (2 ♀, 3 ♂, including holotype of *ptah*), Ghiza (1 ♀, 4 ♂). **ISRAEL**: Bat Yam (1 ♀, 2 ♂). **YEMEN**: Aden (Pulawski, 1971).

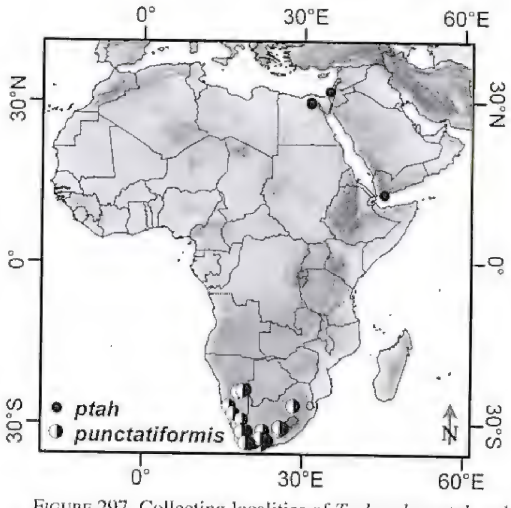


Figure 297. Collecting localities of *Tachysphex ptah* and *punctatiformis*.

Tachysphex pulcher Pulawski

Figures 298, 299.

Tachysphex pulcher Pulawski, 1967a:394, ♀, ♂. Holotype: ♀, Turkmenistan: Akhcha-Kuyma near Nebit-Dagh (ZIN), reexamined in 2006.— Pulawski, 1971:280 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:10 (Israel); Bohart and Menke, 1976:276 (listed); Kazenas, 1978b:112, 124 (in key to Sphecidae of Kazakhstan and Central Asia); Hensen and van Ooijen, 1987:16 (Turkey); Kazenas, 2001:30 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002:74 (Kazakhstan).

Recognition.— *Tachysphex pulcher* has the labrum convex (markedly protruding beyond the clypeal free margin), setae appressed on the postocellar area and sinuous on the lower gena, concealing the integument on the mesopleuron (at least in fresh specimens), and the propodeal side not ridged but setose throughout. This combination is shared with *micans* and the extralimital *fuscispina* Pulawski from Turkmenistan. Some, but not all, specimens have unusual, sparsely spaced rays on the inner hindtibial spur at least near midlength, as in *micans* (see Fig. 233d). Unlike *micans*, the longest setae of the lower gena in *pulcher* are only slightly longer than one midocellar diameter (rather than about two diameters), those on tergum I are straight and appressed (rather than slightly sinuous and not appressed); in the female, the free margin of the lateral lobe is concave (rather than straight or minimally concave); and in the male the hindfemoral venter has the inner (= posterior) margin well defined in distal half (rather than ill defined), and the dorsal volsellar process is low and wide (Fig. 298c), whereas narrow and elevated in *micans*. Unlike *fuscispina* (whose male in unknown), female tergum V of *pulcher* is punctate and setose throughout, and apical spines of tarsomeres IV are twice as long as the tarsomere's apical width, reaching the claw bases (rather than equal to the tarsomeres apical width).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea with ill-defined punctures, as long as 1.1–1.2 of scape in female, 1.3–1.4 in male. Supraantennal swelling in fresh specimens concealed by vestiture. Scutal punctures minute, about one diameter apart. Mesopleuron dull, uniformly microsculptured. Propodeal dorsum and side evenly microsculptured. Hindcoxal dorsum with inner margin obtusely carinate. Inner hindtibial spur varying, its rays either closely spaced (as in most *Tachysphex*) or sparsely spaced (as in *micans*, see Fig. 233d).

Setae sinuous on each side of oral fossa next to occipital carina, slightly longer than midocellar diameter; fully concealing integument on mesopleuron in fresh specimens; on propodeal dorsum

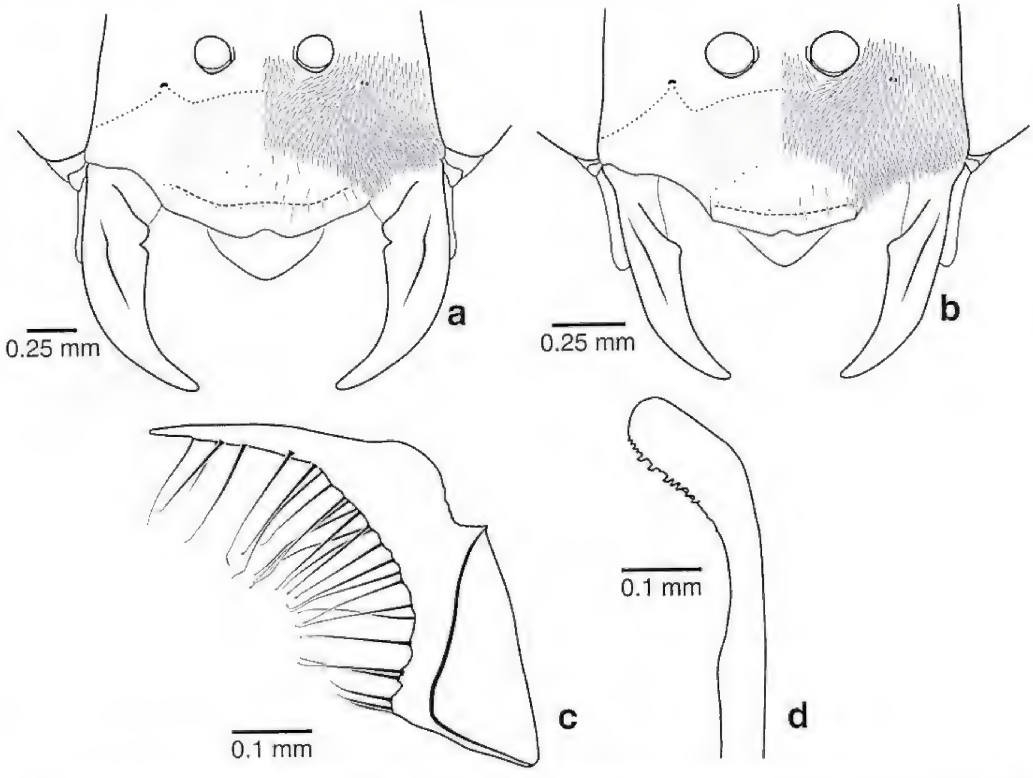


FIGURE 298. *Tachysphex pulcher* Pulawski: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

mostly straight and oriented anterad, but variously oriented in some specimens and somewhat sinuous in a female from Yemen; propodeal side setose throughout; setae of hindfemoral outer surface conspicuous, concealing integument at least apicoventrally.

Head and thorax black, mandible (except dark apical third) and ventral half or third of clypeal middle section yellowish red. Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal vein of forewing yellowish brown or reddish brown, subcostal vein brown. Femora black except red apically or female hindfemur largely red (black basally). Tibiae red or darkened (slightly so in female, largely in male). Tarsi red. Gaster red, three apical segments dark in some females and most males. Terga I–V (I–IV in some males) silvery fasciate apically.

♀.— Clypeus (Fig. 298a): bevel shorter to longer than basomedian area; lip free margin arcuate, emarginate mesally, neither incised nor sinuous laterally. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.9–3.4 × apical width. Forecoxa with small apicomedian process. Dorsal foretibial surface with three spines; outer surface with two or three spines. Forebasitarsus with 7–9 rake spines. Apical spines of hindtarsomere IV reaching claw bases. Apical depression of tergum V punctate and setose throughout. Pygidial plate aciculate, with minute points that are many diameters apart, integument slightly rugose in some specimens. Length 6.5–11.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 298b): bevel as long as basomedian area or shorter; lip free margin arcuate, shallowly emarginate mesally, with well-defined corner and oblique carina emerging from each lip corner; distance between corners 1.0–1.2 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of

flagellomere I 2.3–2.8 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 5–7 rake spines. Outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin well defined in distal half. Length 5.3–8.6 mm. Volsella and penis valve: Figs. 298c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 299).— Azerbaijan to Sinai Peninsula and Yemen, east to Kazakhstan and Tajikistan.

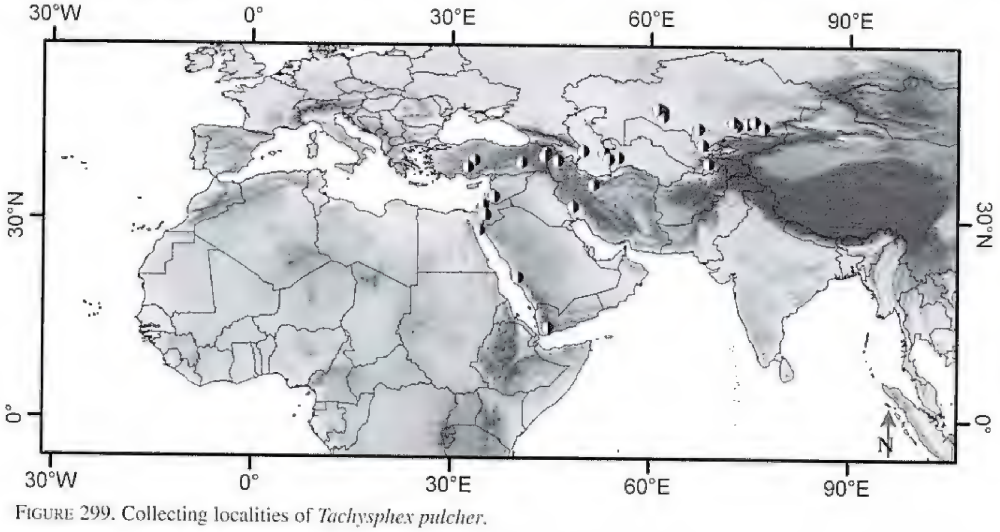


FIGURE 299. Collecting localities of *Tachysphex pulcher*.

RECORDS (localities not followed by the number of specimens examined or reference to literature are taken from Pulawski, 1971).— **ARMENIA**: Arax Valley. **AZERBAIJAN**: Baylov and Bibi–Eidat near Baku, Dissar near Ordubad in Nakhichevan' Autonomous Republic (1 ♀, paratype of *pulcher*). **EGYPT**: **Sina** (= Sinai): 30–35 km E St. Catherine monastery on Nuweiba road (1 ♂). **IRAN**: **Khuzestan**: Haft Tapeh 300 km N Abadan (1 ♂). **Teheran**: 30 km S Teheran (2 ♀). **ISRAEL**: 8 km NNE Ashkelon (1 ♂, CSE), Bat Yam 3 km S Yaffa, Beersheba (2 ♀, 3 ♂), En Haseva 35 km S Dead Sea, Raanana 20 km NNE Tel Aviv, 5 km SSE Sede Boker (1 ♂, CSE), Wadi En Aqrabbim 50 km SE Beersheva (1 ♂, CSE). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: Koilibay in Malye Barsuki sands (P). **Almaty**: 15 km S Aksuek 250 km NW Almaty at about 44.5°N 74.5°E (K), 65 km W Bakanas (K), Kapchagay 75 km N Almaty (2 ♀, 1 ♂). **Qostanay**: Zhalanash (K). **Qyzylorda**: 30 km SW Aral'sk (K), 10 km NNW Kamyshlybash (K), 28 km SW Kazalinsk (1 ♀, 3 ♂), 20 km S Yany-Kurgan (K). **South Kazakhstan**: 5 km W Chardara (K). **Zhambyl**: 4–5 km SE Furmanovka on Chu River (1 ♀), 70 km NW Furmanovka (1 ♂). **LEBANON**: Mruh Bagdash in Beqaa Valley (1 ♀). **SAUDI ARABIA**: Wadi Majarish below Taif (1 ♀, 1 ♂, KMG). **SYRIA**: Barze 10 km N Damascus (1 ♀, 2 ♂), 20 km E Damascus. **TAJIKISTAN**: Dushanbe. **TURKEY**: **Ağri**: Doğubayazit (Hensen and van Ooijen, 1987). **Ankara**: Tuz Golu. **Bingöl**: 15 km S Genç (Hensen and van Ooijen, 1987). **Konya**: Konya (1 ♀, 1 ♂). **TURKMENISTAN**: Akhcha-Kuyma near Nebit-Dagh, Krasnovodsk (1 ♀, paratype of *pulcher*), Nadezhdin, Uzun-Ada on E side of Gulf of Krasnovodsk. **YEMEN**: Sanaa (2 ♀, 2 ♂; 6 ♀, 4 ♂, RMNH).

Tachysphex punctatiformis Arnold

Figures 297, 300.

Tachysphex punctatiformis Arnold, 1923:151, ♀, ♂ (authorship attributed to Brauns). Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (SAM), **here designated**, examined.— Bohart and Menke, 1976:276 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

RECOGNITION.— *Tachysphex punctatiformis* has an all black gaster (silvery tergal fasciae either absent or rudimentary and present only laterally), black femora and tibiae, setae erect and sinuous on the head and thorax and inclined posterad on the propodeal dorsum, male foretarsus with a conspicuous rake, and male sterna II–VI with impunctate apical depressions. Also, the clypeal lip is not receded laterally in the female (Fig. 300a) and not pointed in the male (Fig. 300b), whereas respectively receded or pointed in *mesembrius*. In addition, the labrum is flat, the galea no longer than wide in profile, the cubital and anal ends of hindwing crossvein cu-a are equidistant from the wing base, and the tarsi are unspecialized (length of tarsomeres II more than twice apical width, length of tarsomeres IV more than apical width, and apical tarsomeres without ventral or lateral spines).

The above character combination is shared with *crassipes*, and many specimens can be distinguished only by slightly different proportions of their postocellar area: in *punctatiformis*, the width of postocellar area is 1.1–1.6 × length in the female and 1.1–1.3 in the male, whereas in *crassipes* 0.8–0.9 and 0.7–0.8, respectively. In many *punctatiformis*, in addition, the mesopleural punctures are absent or evanescent and the setae are sinuous and erect on the scape lateroventrally, suberect on the basal declivity of tergum I, and in some females also on the hindfemoral venter. In *crassipes*, the mesopleural punctures are well defined, and the scapal, hindfemoral, and tergal setae are all straight, appressed or nearly so. The geographic ranges of the two species are mutually exclusive: *punctatiformis* is known from central and western South Africa and southern Namibia, whereas *crassipes* occurs in Zimbabwe and northeastern South Africa (former Transvaal).

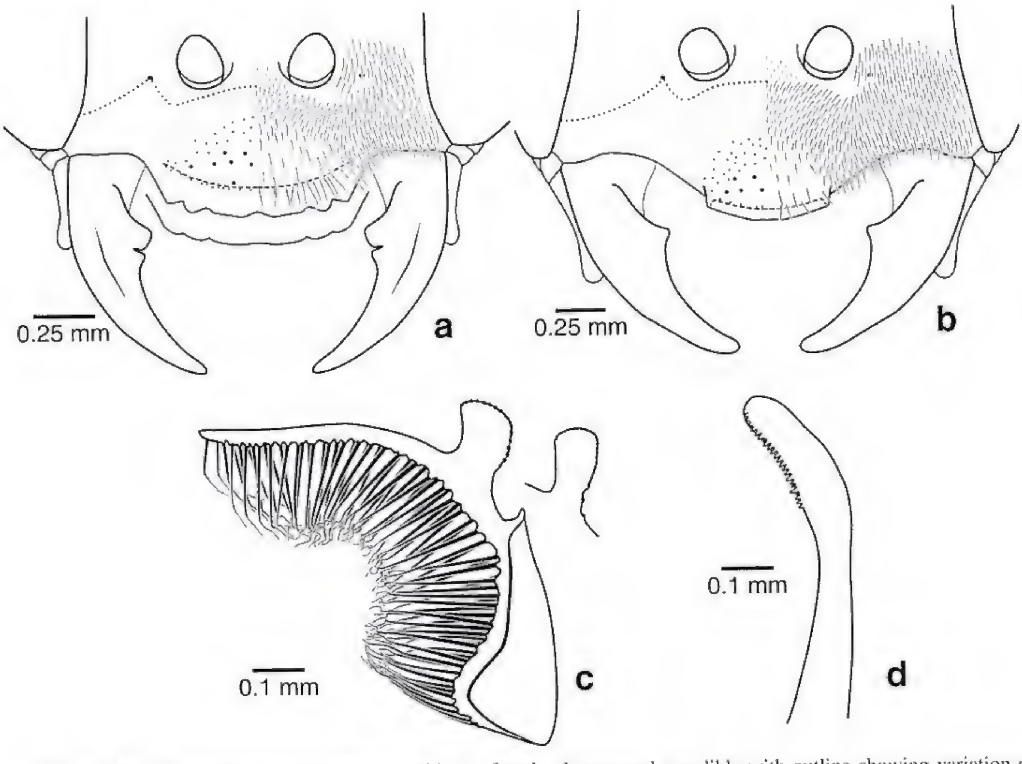


FIGURE 300. *Tachysphex punctatiformis* Arnold: a – female clypeus and mandible with outline showing variation of clypeal free margin; b – male clypeus and mandible; c – volsella with outline showing variation of dorsal process; d – penis valve.

Also similar to *punctatiformis* is the female of *glaber* from the Abd el Kuri Island, in which, however, the free margin of the clypeal lobe is neither emarginate mesally nor incised laterally. In *punctatiformis*, the clypeal lip has at least a rudimentary lateral incision, but in most specimens the incision is well defined and there is also a median notch.

SPECIES DELINEATION.— The females that I assign to *punctatiformis* vary considerably in the mesopleural punctation and in the length of tergal and hindfemoral setae. The extreme forms appear to be distinct species at first, but a closer analysis suggests continuous variation (see Variation below for details).

STATUS OF THE SPECIES.— *Tachysphex punctatiformis* and *crassipes* may be geographic forms of one species, as they are similar morphologically and inhabit mutually exclusive but almost adjacent areas: Namibia and western and central South Africa (*punctatiformis*) and Botswana, Zimbabwe, and northeastern South Africa (*crassipes*). The gap between these ranges may result from inadequate collecting. I treat them as discrete species because I could not demonstrate intergradation.

DESCRIPTION.— Scutal punctures well defined, averaging several diameters apart on disk in female, about one to several diameters apart in male; interspaces shiny, unsculptured or nearly so. Mesopleuron microsculptured (conspicuously so in most specimens); punctures absent to deep, conspicuous (ranging from about one diameter apart to many diameters apart). Episternal sulcus complete in some specimens. Propodeal dorsum mostly ridged, but ridges inconspicuous or evanescent in some males; side with well-defined ridges, but practically unridged in single male from Kamiesberg, South Africa. Hindcoxal dorsum with inner margin carinate at least basally.

Setae sinuous and erect or nearly so on postocellar area, gena, thorax, and midfemoral venter (straight or nearly so on midfemoral venter in several males), inclined posterad on propodeal dorsum. In many specimens, setae are also erect and sinuous on scape lateroventrally, suberect on basal declivity of tergum I, and in female suberect on hindfemoral venter (at least basally) Setal length expressed as a fraction of basal mandibular width: 0.5–0.7 on postocellar area, 0.5–0.8 on scutum anteriorly, up to 0.5 on midfemoral venter (0.2 in males with straight setae).

Head, thorax, legs, and gaster black except mandible reddish mesally and apical tarsomeres brown or red. Frontal setae silvery in both sexes. Wing membrane slightly infumate, costal and subcostal veins of forewing dark brown. Terga either without silvery fasciae or rudimentary fasciae present on terga I–III laterally.

♀.— Clypeus (Fig. 300a): bevel ill defined but longer mesally than basomedian area; lip free margin arcuate but otherwise varying. Width of postocellar area markedly varying, 1.1–1.6 × length. Dorsal length of flagellomere I 2.3–2.4 × apical width. Apicomedian forecoxal process inconspicuous in most specimens but well defined in two females from Willowmore, South Africa. Midtrochanteral venter: punctures large, several diameters apart in most specimens, but fine, averaging 2–3 diameters apart in one female from Willowmore and one from Vanrhynsdorp, South Africa. Forefemoral venter and posteroventral surface, in most specimens, with large punctures that are several to many diameters apart (interspaces unsculptured to conspicuously microsculptured). Dorsal foretibial surface with two or three spines; outer surface with three spines, micropunctures many diameters apart. Forebasitarsus with 7–9 rake spines. Apical depression of tergum V largely impunctate and asetose. Pygidial plate with punctures that average many diameters apart on disk, about 1–2 diameters apart near margin. Length 9.5–12.3 mm. Volsella and penis valve: Figs. 300c, d.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 300b): bevel shorter than basomedian area or ill defined; lip free margin arcuate, with well-defined corner; distance between corners 0.5–0.8 × distance between corner and orbit. Width of postocellar area 1.1–1.3 ×

length. Dorsal length of flagellomere I 2.0–2.2 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna II–VI with impunctate apical depressions (at least partly so), largely impunctate in specimens from Mariental District, Namibia. Apical margin of sternum VIII tridentate in one specimen from Willowmore, but middle tooth evanescent in others. Length 8.5–11.5 mm. Volsella and penis valve: Figs. 300c, d.

VARIATION.— *Tachysphex punctatiformis* varies considerably in the size of the mesopleural punctures and the length of scapal, tergal, and hindfemoral setae. In most cases, individuals with well-defined mesopleural punctures also have long setae on tergum I and the hindfemoral venter, and vice versa. A female from Willowmore, however, combines relatively small mesopleural punctures with long hindfemoral setae; another female from Willowmore and two females from Dassiefontein, South Africa, have coarse mesopleural punctures but the tergal and femoral setae are appressed. Details on variation are presented below:

Scapal setae. Setae are either erect on the lateroventral scapal margin and up to two midocellar diameters long, or straight and appressed.

Mesopleural punctures. The mesopleuron has well-developed punctures in most females, but punctures are small, inconspicuous in two females from Dassiefontein, one from Springbok, one from Vanrhynsdorp, and one from Willowmore; punctures are barely recognizable (practically absent) in one female from Clanwilliam, one from George, one from Goegap Nature Reserve, one from Richtersveld National Park, and one from Willowmore, all South Africa.

Female clypeus. The clypeal lip, in most specimens, is shallowly notched mesally and has two prominent, lateral incisions on each side, but the median notch is shallow and only one lateral incision is present in a female from Melton Wold, one from Richtersveld, and one from Springbok; and the median notch is absent and the lateral incisions are rudimentary in single female from Burgersdorp area, all South Africa (Fig. 300a, outline).

Female hindfemoral setae. Most females have conspicuous erect setae on the hindfemoral venter (longest setae up to 0.6 × hindfemoral maximum width), but setae are somewhat shortened in the smallest specimen from Willowmore (0.4 × femoral width), nearly totally reduced in another one from the same locality (0.2 × femoral width) and the females from Springbok (0.1 × femoral width). The females from Dassiefontein, George, and Richtersveld have no erect setae.

Female tergum I: setae. The anterior declivity of tergum I is covered with suberect, conspicuous setae in most specimens, including the holotype (setal length up to 0.6 × basal mandibular width), but the setae are shorter in the smallest female from Willowmore (up to 0.3 mandibular width), and all are appressed in the females from Goegap Nature Reserve, one from George, one from Richtersveld National Park, and one from Willowmore.

FLORAL RECORD.— The specimen collected between Aus and Rosh Pinah were visiting pink flowers of *Galenia* sp. (Aizoaceae), as reported by the collectors, F.W. and S.K. Gess.

COLLECTING PERIOD.— 5 May through October.

GEOGRAPHIC DISTRIBUTION (Fig. 297).— Namibia to western and central South Africa.

RECORDS.— **NAMIBIA**: **Gobabis District**: Aminuis (5 ♀, SAM). **Lüderitz District**: Aus to Rosh Pinah at 26°50.1′S 16°17.6′E (1 ♀, AMG). **Mariental District**: Onze Rust 192 [Farm] (1 ♂, AMG), Vaalbank 319 [Farm] (1 ♂; 2 ♀, 1 ♂, AMG; 1 ♂, NMN). **SOUTH AFRICA**: **Eastern Cape Province**: between Burgersdorp and Nooitgedacht (1 ♀, SAM), Steynsburg (1 ♀, SAM), Venterstad Region (1 ♀), Willowmore (1 ♀; 1 ♀, 1 ♂, AMG; 2 ♀, 2 ♂, SAM, including lectotype of *punctatiformis*; 4 ♀, 5 ♂, TMP). **Gauteng**: Malanskraal at 26°41′S 28°25′E (1 ♀, AMG). **Northern Cape Province**: Anenous at 29°15′S 17°30′E (1 ♀, AMG), Bowesdorp in Namaqualand (2 ♂, SAM), W Calvinia (1 ♂, OÖLM), Dassiefontein Farm 14 road km E Kamiesksroon (2 ♀, 5 ♂), Goegap Nature Reserve (1 ♀, 2 ♂; 2 ♀, 5 ♂, AMG), Goegap Nature Reserve at 29°37′S 17°59′E (1 ♂, AMG) and 29°37′S 18°00′E (1 ♂; 2 ♂, AMG), Kamiesberg at 30°10′S 18°11′E (1 ♂,

PPRI), Melton Wold (5 ♂, SAM), Richtersveld National Park: Koeroegabvlakte at 28°11′S 17°03′E (1 ♀, AMG), 90 km ENE Springbok at 29°20.1′S 18°44.3′E (1 ♂). **Western Cape Province**: 4 mi S Clanwilliam (1 ♀, SAM), Clanwilliam Dam at 32°18′S 18°57′E (1 ♂, AMG), George (1 ♀, SAM), Het Kruis (1 ♂, SAM), Knersvlakte 48 km N Vanrhynsdorp at 31°14′S 18°32′E (3 ♂, AMG), Ladismith (1 ♀, AMG), Lamamerskraal in Prince Albert District (1 ♀, SAM), Langkloof NE Montagu (1 ♂), ca 10 km NNW Montagu at 33°42.2′S 20°04.1′E (1 ♂), Pakhuis Pass (1 ♀), Vanrhynsdorp (3 ♀, TMP), Worcester (1 ♂, UCD), Worcester: Karoo Gardens (2 ♂).

Tachysphex punctatus (F. Smith)

Figures 301, 302.

Larrada punctata F. Smith, 1856:282, ♀, actually ♂. Holotype: ♂, South Africa: Western Cape Province: Cape of Good Hope (BMNH), examined.— As *Larra punctata*: Kohl, 1885:247 (new combination, listed); Dalla Torre, 1897:672 (in catalog of world Hymenoptera).— As *Tachysphex punctatus*: R. Turner, 1917a:323 (new combination, diagnostic characters, as *punctata*), 1917d:292 (new combination, diagnostic characters, description of ♀); Arnold, 1923:148 (in revision of southern African species), 1930:2 (listed); Bohart and Menke, 1976:276 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Recognition.— *Tachysphex punctatus* has a labrum moderately convex and moderately protruding beyond the clypeal free margin (less so than in *panzeri* or *pentheri*), elongate galea (length equal to about 0.6 of scape), propodeal dorsum glabrous apicomesally, and the fore- and mid-femoral venters shiny and unsculptured except for a few, sparse punctures (male forefemur unsculptured only between the notch and apex, or only on posteroventral surface). In addition, the wing membrane is conspicuously infumate, the postocellar area is broad (width 1.2–1.3 × length in female, 1.1–1.5 × length in male), and the terga have no silvery fasciae. *Tachysphex marshalli* and *quadricolor* have a similar labrum, galea, postocellar area (width 0.9 × length in some specimens), propodeal setation, femoral sculpture, and nonfasciate terga, but in *punctatus* the legs are all black (except the tarsal apex), the clypeal lip of the female is only slightly arcuate (Fig. 301a), the dorsal length of male flagellomere I equals 1.3–1.4 × apical width, male sterna are covered with appressed setae, and the gaster is all black in most specimens. In the other two species, at least the foretibiae and tarsi are red (also the gaster is red in *quadricolor*, at least basally), the clypeal lip of the female is arcuate (Figs. 221a and 398a), the dorsal length of male flagellomere I is 2.4–2.8 × apical width, and male sterna IV–VI are covered with inclined setae.

Description.— Labrum convex (but less so than in *panzeri* or *pentheri*), protruding beyond clypeal free margin. Galea minutely, densely punctate except anteriorly (punctures about one diameter apart), about as long as 0.6 of scape. Scutum: discal punctures averaging 1–2 diameters apart, but several diameters apart in some specimens; interspaces shiny. Mesopleuron dull, shallowly punctatorugose or with punctures that are about one diameter apart beneath scrobe. Propodeal dorsum evenly microareolate; side dull, ridged (minutely so in some specimens), inconspicuously punctate. Hindcoxal dorsum with inner margin not carinate.

Setae erect or nearly so on postocellar area but no longer than midocellar diameter; about one midocellar diameter long on each side of oral fossa next to occipital carina; appressed on scutum; appressed and oriented posterad on propodeal dorsum (apicomedian area glabrous).

Head, thorax, legs, and gaster black, but mandible reddish mesally, apical tarsomeres brown or reddish, and terga I–V, in some females, with ill-defined preapical reddish zone. Frontal setae silvery in both sexes. Wing membrane conspicuously infumate; forewing costal vein dark brown, subcostal vein black. Terga without silvery, apical fasciae.

♀.— Clypeus (Fig. 301a): bevel markedly longer than basomedian area; lip slightly arcuate, at most with shallow median notch, sinuous laterally. Width of postocellar area 1.2–1.3 × length.

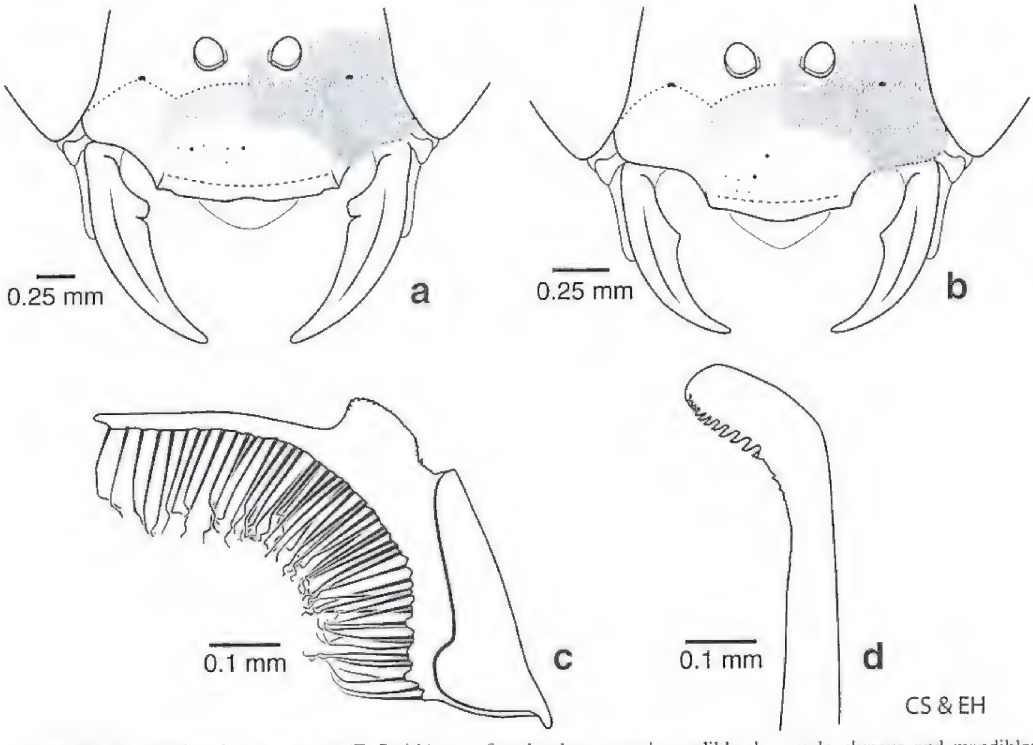


FIGURE 301. *Tachysphex punctatus* (F. Smith): a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Dorsal length of flagellomere I 2.4–2.5 × apical width. Fore- and midfemoral venters unsculptured except for a few, sparse punctures. Dorsal foretibial surface with two or three spines; outer surface with narrow, asetose zone, with two or three preapical spines. Forebasitarsus with eight or nine rake spines. Apical depression of tergum V varying from punctate and setose to partly impunctate and glabrous. Pygidial plate with punctures varying: averaging several diameters apart mesally and less than one diameter near margin in most specimens, but all punctures less than one diameter apart in some individuals; interspaces microsculptured at least basally. Length 9.8–11.5 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 301b): bevel markedly longer than basomedian area; lip free margin arcuate, slightly concave near corner (which is well defined), distance between corners 0.9–1.0 × distance between corner and orbit. Width of postocellar area 1.1–1.5 × length. Dorsal length of flagellomere I 1.3–1.4 × apical width. Forefemur: notch unsculptured, glabrous; venter unsculptured between notch and apex except for a few minute punctures (only posteroventral surface unsculptured in some specimens). Midfemoral venter unsculptured except for a few, sparse punctures. Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II as long as tarsomere III or longer. Length 7.0–8.3 mm. Volsella and penis valve: Figs. 301c, d.

FLORAL RECORDS.— The specimens collected 12 km E Springbokwater, Namibia, were visiting flowers of *Zygophyllum simplex* L. (Zygophyllaceae), as recorded by F.W. and S.K. Gess, the collectors.

GEOGRAPHIC DISTRIBUTION (Fig. 302).— Southern Namibia and Eastern, Northern, and Western Cape Provinces of South Africa.

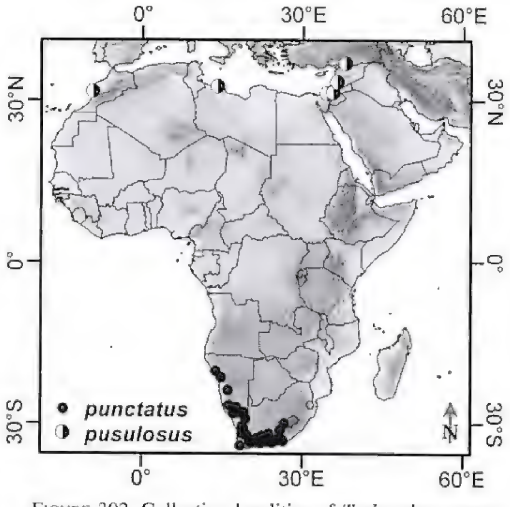


FIGURE 302. Collecting localities of *Tachysphex punctatus* and *pusulosus*.

RECORDS.— NAMIBIA: Bethanien District: Churutabis [Farm] (1 ♀, NMN), Vogelstrausskluft 87 [Farm] (1 ♀, NMN). **Damaraland:** 12 km E Springbokwater at 20°15′S 13°44′E (1 ♀; 1 ♀, AMG), Uis to Hentiesbaai at 21°27′S 14°45′E (2 ♀, AMG). **Karasburg District:** Karasburg (1 ♀, AMG), 30 km E Karasburg (1 ♂, AMG). **Lüderitz District:** Aus (2 ♀, 1 ♂; 1 ♀, BMNH). **Windhoek District:** Solitaire at 23°52′S 16°00′E (1 ♀, AMG). **SOUTH AFRICA: Eastern Cape Province:** Grahamstown: Carlisle Bridge (1 ♀, AMG), 18 km WNW Grahamstown: Hilton Farm (1 ♀), Middelburg Division (2 ♂), Steynsburg (1 ♀, SAM), 28 km S Steytlerville: Wolwekraal Farm (1 ♀, 2 ♂, USU), Waterford (2 ♀, AMG), Willowmore (1 ♀; 2 ♀, AMG; 12 ♀, 5 ♂, TMP). **Northern Cape Province:** Pofadder (1 ♀; 1 ♂, SAM), Richtersveld National Park (1 ♀, SAM), Tanqua-Karoo National Park at Renoster River (1 ♀, SAM). **Western Cape Province:** Beaufort West (1 ♀, BMNH; 1 ♂, SAM), Cape of Good Hope (1 ♂, BMNH, holotype of *punctatus*), Dikbome Farm near Merweville (1 ♀, SAM), Kliprand 60 km WNW Loeriesfontein (1 ♂; 1 ♂, OÖLM), Knersflakte: Kalkgat (1 ♀, OHL), Laingsburg at 33°12′S 20°51′E (1 ♀), 30 km ENE Laingsburg at 33°08′S 21°08′E (1 ♀), 50 km W Loeriesfontein (1 ♂, OÖLM), Matjiesfontein (1 ♂), Murraysburg District (1 ♀, SAM), Olifants River between Klawer and Clanwilliam (2 ♂, SAM), Oudtshoorn: Onverwacht at 33°38′S 22°14′E (1 ♂, AMG), 18 mi SE Touwsrivier (1 ♂, KU).

Tachysphex punctiger Pulawski, sp. nov.

Figures 303, 304.

DERIVATION OF NAME.— *Punctiger*, a Latin masculine noun derived from *punctum*, a puncture, and the suffix *-ger*, a bearer; with reference to the conspicuously punctate integument of this species.

RECOGNITION.— *Tachysphex punctiger* is immediately recognized by its punctate propodeal dorsum (punctures well defined) with shiny, unsculptured interspaces (Fig. 303c). *Tachysphex gagates* and occasional males of *pentheri* with a nonemarginate forefemur are similar, but unlike these species the gaster of *punctiger* is all black (rather than all or partly red), with well-defined tergal punctures and setae erect on tergum I.

DESCRIPTION.— Labrum slightly convex (minimally so in smallest males), protruding beyond clypeal free margin. Galea longer than wide in profile, as long as 0.8 of scape. Mesothoracic punctures well defined (interspaces unsculptured, shiny), averaging about 2–3 diameters apart on scutal disk, varying from one to three diameters apart at center of mesopleuron, and about 1–2 diameters apart on mesothoracic venter. Propodeal dorsum and side with well-defined punctures (also posterior surface along lateral margin), interspaces unsculptured, shiny (Fig. 303c). Hindcoxal dorsum with inner margin carinate basally. Tergal punctures well defined, conspicuous on apical terga in male.

Setae less than one midocellar diameter long on each side of oral fossa; erect and sinuous on postocellar area (up to 0.7 of basal mandibular width), scutum (about 0.6 of basal mandibular width anteriorly), propodeal dorsum, and basal half of tergum I (up to 0.7 of basal mandibular width).

Head and thorax black, mandible largely reddish (black basally, dark apically). Frontal setae

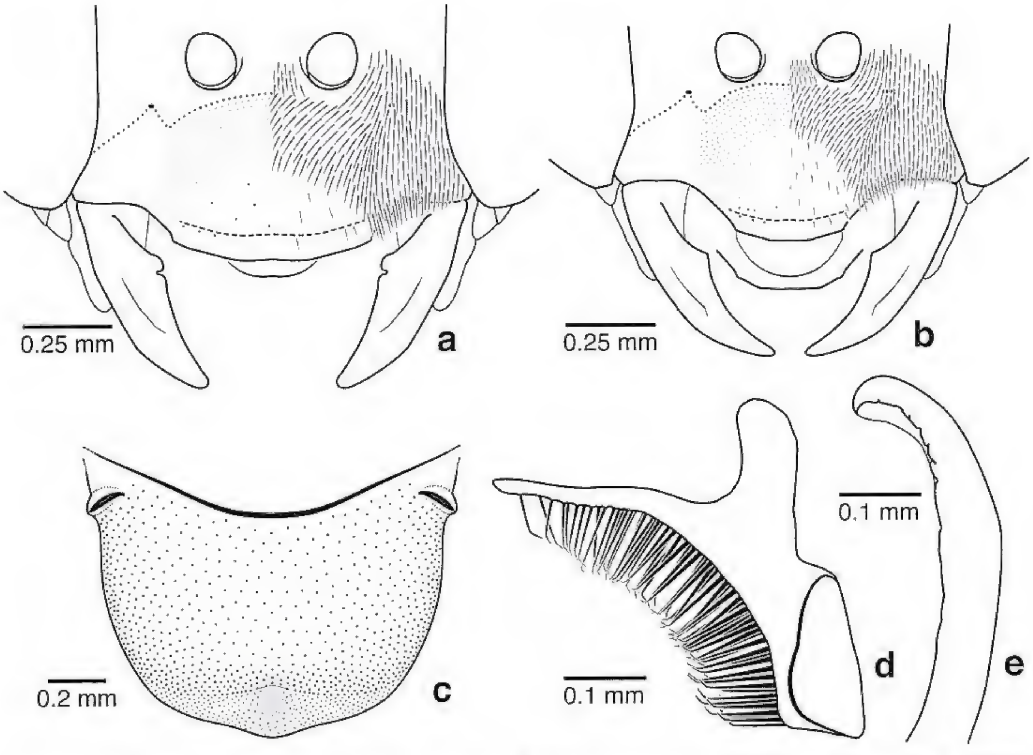


FIGURE 303. *Tachysphex punctiger* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible with outline showing variation of free margin; c – propodeal dorsum showing sculpture; d – volsella; e – penis valve.

silvery in both sexes. Wing membrane almost hyaline; forewing costal vein yellowish, subcostal vein light brown. Femora black (red apically), tibiae and tarsi red. Gaster black. Terga I–III or I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 303a): bevel about as long as basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 1.4 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Midtrochanteral venter shiny, with minute punctures that are several diameters apart. Fore- and midfemoral venters unsculptured, shiny, except for a few scattered punctures. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with six rake spines on one leg and seven on other in single specimen examined. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with scattered punctures, interspaces almost unsculptured. Length 7.8 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Fig. 303b): bevel about as long mesally as basomedian area; lip free margin arcuate, forming practically single curved line with rest of clypeal margin (corner ill defined or absent). Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width. Forefemoral notch glabrous, laterally compressed (i. e., with obtuse, longitudinal crest). Outer margin of forebasitarsus with four rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sternum VIII: apical margin evenly emarginate or with small median projection. Length 5.3–6.1 mm. Volsella and penis valve: Figs. 303d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 304).— Western Namibia and western South Africa.

Records.— Holotype: ♂, Namibia: Swakopmund District: 63 km NE Swakopmund, 9 Dec 1996, WJP (CAS). Paratypes: **NAMIBIA**: **Karasburg District**: Farm Altdorn 3 30 km NE Ai Ais at 27°48′16″S 17°40′02″E, 19 Nov 1996, M.E. Irvin, E.I. Schlinger, and D.K. Yeates (1 ♂, CSE). **Lüderitz District**: Aus, Dec 1929, R.E. Turner (1 ♀, 1 ♂, BMNH); Namuskluft 88 [Farm], 7–15 Oct 1970, collector unknown (1 ♂, NMN). **Swakopmund District**: Hentiesbaai, 18 Feb 1996, WJP (1 ♂); 63 km NE Swakopmund, WJP, 5 Dec 1996 (1 ♂) and 9 Dec 1996 (1 ♂). **SOUTH AFRICA**: **Northern Cape Province**: Olifantshoek, 26 Nov 1990, R. Miller and L. Stange (1 ♀); Van-Wyksfontein 8 km W Norvalspont, 1–9 Dec 1988, FSG (1 ♂, AMG). **Western Cape Province**: 60 km N Cape Town, 9 Nov 1999, M. Halada (1 ♀, OÖLM).

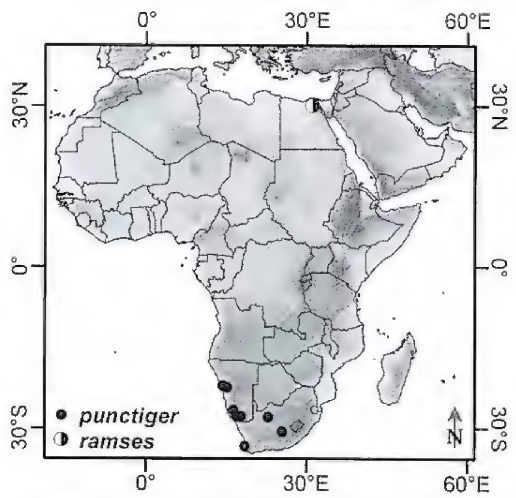


Figure 304. Collecting localities of *Tachysphex punctiger* and *ramses*.

Tachysphex pusulosus de Beaumont

Figures 302, 305.

Tachysphex pusulosus de Beaumont, 1955:184, ♀. Holotype: ♀, Libya: Tripolitania: Corradini (BMNH), examined in 1974.— de Beaumont, 1956a:199 (Libya); Pulawski, 1971:136 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:8 (Israel); Bohart and Menke, 1976:276 (listed).

Recognition.— *Tachysphex pusulosus* (Morocco to southern Turkey) is characterized by an unusually expanded supraantennal swelling (Figs. 305c-f). It also has a nearly flat, partly exposed labrum, wide postocellar area (width 1.6 × length), punctatorugose mesopleuron, black tibiae, non-fasciate tergum IV, and in the female the clypeal lip has at most one lateral incision and the tarsi are nonabbreviated (length of midtarsomere II about 2.5 × apical width). The supraantennal swelling is also expanded in *bipustulosus* and to a lesser degree in *mashona* and *ovambo*, which occur south of the equator. All three have the labrum concealed under the clypeus, a markedly narrower postocellar area (width 1.1–1.3 × length in female, 1.0–1.2 × in male), mesopleuron punctate, tergum IV silvery fasciate, tibiae red in many specimens, and in the female the clypeal lip with at last two lateral incisions and the tarsi abbreviated (length of midtarsomere II 1.6–1.8 × apical width).

Description.— Labrum flat, partly exposed (Figs. 305a, b). Galea longer than wide in profile, as long as 0.8 of scape. Supraantennal swelling unusually, conspicuously expanded (Figs. 305c-f); dorsal section of antennal socket rim also conspicuously expanded (markedly higher than ventral section), separated from supraantennal swelling by constriction in female, not separated in male. Scutal punctures well defined, on disk up to 2–3 diameters apart in female, about one diameter apart in male. Axilla somewhat swollen, abruptly sloping down laterally. Mesopleuron punctatorugose. Punctures of mesothoracic venter, anterad of each coxa, several diameters apart in female, about 1–2 diameters apart in male. Propodeal dorsum irregularly rugose; side ridged in female, irregularly so in male. Sternum I, in female, with short, median carina on apical depression.

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina, shorter than midocellar diameter; oriented obliquely anterad on propodeal dorsum. Sternum I in female largely glabrous.

Body black except mandible reddish mesally and tarsal apex brown. Frontal setae silvery in

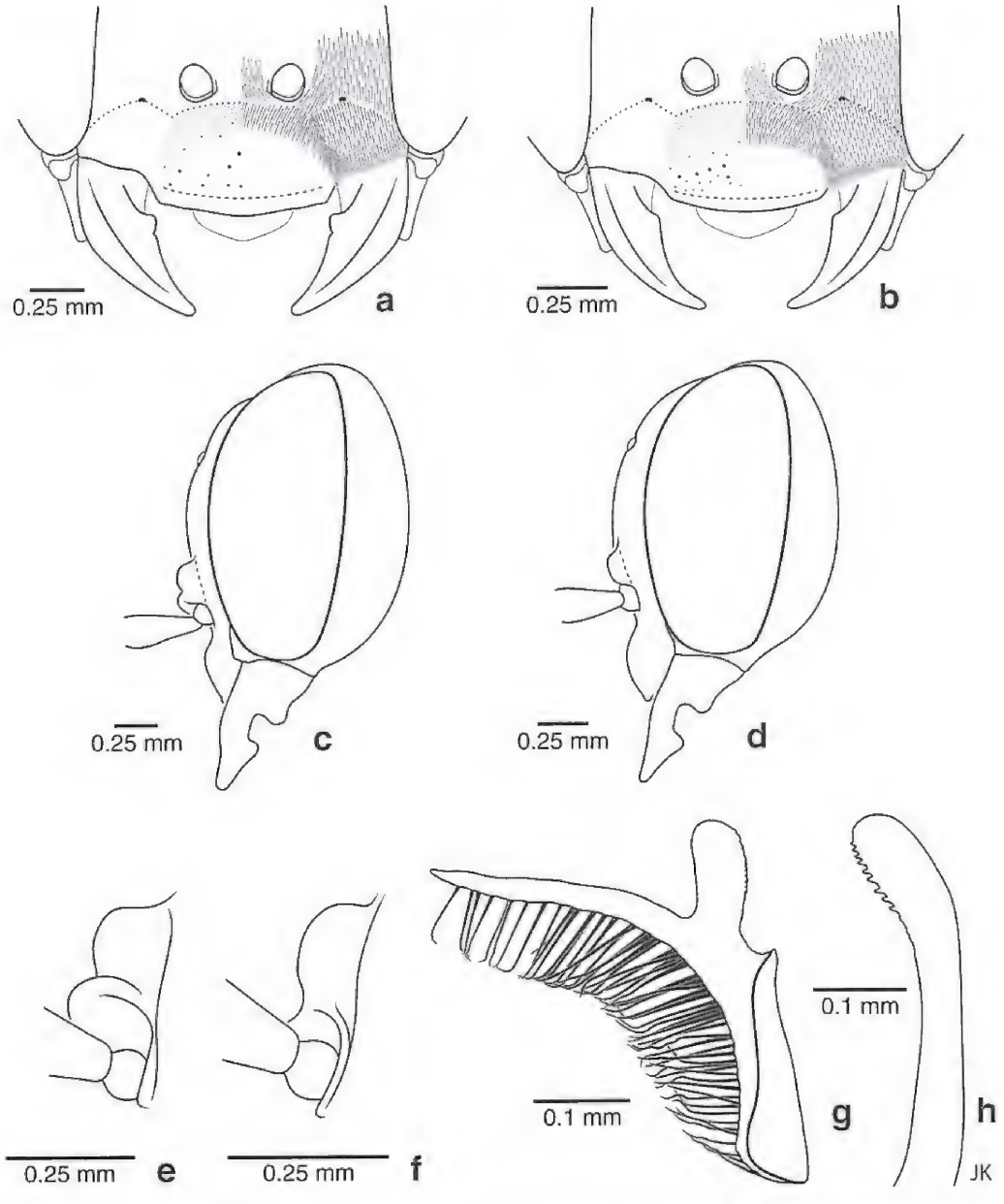


FIGURE 305. *Tachysphex pusulosus* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – female head in lateral view; d – male head in lateral view; e – supraantennal swelling of female; f – supraantennal swelling of male; g – volsella; h – penis valve.

both sexes. Wing membrane slightly infumate; costal vein of forewing light brown, subcostal vein brown. Terga I–III each with ill-defined apical, silvery fascia.

♀.— Clypeus (Fig. 305a): bevel markedly longer than basomedian area, delimited by obtuse carina that emerges from lip corner; lip free margin arcuate, incised or not incised laterally. Width

of postocellar area 1.5–1.6 × length. Dorsal length of flagellomere I 2.0–2.5 × apical width. Trochanters I–III with venter shiny, unsculptured except for a few, sparse punctures. Fore- and midfemoral posteroventral surfaces shiny, unsculptured and asetose in basal half or so (except in specimen from Khan Hadrur); hindfemoral venter asetose. Dorsal foretibial surface with three spines; outer surface unsculptured, shiny, with two spines. Forebasitarsus with nine rake spines. Tergum V: punctures several to many diameters apart, apical depression impunctate, glabrous. Pygidial plate shiny, unsculptured, except for several, sparse punctures (a few punctures less than one diameter apart). Length 6.0–8.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 305b): bevel longer than basomedian area; lip free margin arcuate, with obtuse but well-defined corner; distance between corners 1.6 × distance between corner and orbit. Width of postocellar area 1.6 × length. Dorsal length of flagellomere I 1.6 × apical width. Forefemoral notch: bottom microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Sternum VIII slightly tridentate apically in single specimen available for this study. Length 6.0 mm. Volsella and penis valve: Figs. 305g, h.

GEOGRAPHIC DISTRIBUTION (Fig. 302).— Morocco, Libya, Israel, Jordan, Syria, south Turkey.

RECORDS.— **ISRAEL**: Khan Hadrur in Judean Desert, now Ma'ale Ha-Adumim (Pulawski, 1971). **JORDAN**: 20 km from Madaba toward Main Hammamet (1 ♀; 1 ♀, SCHL). **LIBYA**: **Tripolitania**: Corradini (de Beaumont, 1955). **MOROCCO**: Agadir (de Beaumont, 1955). **SYRIA**: Douma (1 ♀). **TURKEY**: **Urfa**: Birecik (1 ♂).

Tachysphex quadricolor (Gerstaecker)

Figures 306–310.

Lyrops quadricolor Gerstaecker *in* Peters, 1858:510, ♀. Holotype: ♀, Mozambique: no specific locality (ZMHU), examined.— As *Tachytes quadricolor*: Dalla Torre, 1897:693 (new combination, in catalog of world Hymenoptera).— As *Tachysphex quadricolor*: Stadelmann, 1897:255 (study of type, new combination); R. Turner, 1917d:43 (new combination); Arnold, 1923:175 (listed, original description translated into English), 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:276 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Lyrops quadricolor Gerstaecker, 1862:477, ♀. Objective synonym of *Lyrops quadricolor* Gerstaecker, 1858.

Tachysphex depilosellus R. Turner, 1917a:322, ♀. Lectotype: ♀, Zambia: Pakasa, locality of unknown location (BMNH), **here designated**, examined. **New synonym**.— Arnold, 1923:173 (original description copied), 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:273 (listed).

Tachysphex depilosellus var. *fallax* Arnold, 1924:71, ♀, ♂. Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (SAM), **here designated**, examined. **New synonym**.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex depilosellus fallax*: Bohart and Menke, 1976:273 (new status, listed).

RECOGNITION.— *Tachysphex quadricolor* has the fore- and midfemoral venters shiny, unsculptured except for a few, sparse, large punctures (Figs. 308c, d) and a moderately broad postocellar area (width 1.0–1.3 × length in female, 0.9–1.1 × in male). In addition, the mesopleuron is uniformly microsculptured, the propodeal dorsum of most specimens is glabrous apicomesally, the labrum is convex, protruding beyond the clypeal free margin in the female and most males, the galea is elongate (length equal to about 0.7 of scape), and the male foretarsus has a well-developed rake. *Tachysphex marshalli* and *punctatus* are similar. Unlike *marshalli*, the gaster of *quadricolor* is either all red or red basally and black apically (rather than all black or black basally and red apically); the mesopleural setae are light, and in southern African populations appressed or nearly so beneath the scrobe (rather than dark, erect); and the female forebasitarsus is all micropunctate and not concave. Also, the wings of *quadricolor* vary from uniformly black with violet shimmer (Figs.

306, 309a) to bicolored: yellowish with infumate apical band (Figs. 307, 309b), whereas they are all black with violet shimmer in *marshalli*. Unlike *punctatus*, the gaster and legs of *quadricolor* are all or largely red (rather than all or predominantly black), the clypeal lip of the female is markedly arcuate (compare Figs. 308a and 301a), the dorsal length of male flagellomere I is 2.2–2.6 × apical width (rather than 1.3–1.4), and sterna IV–VI are covered with inclined (rather than appressed) setae (Fig. 308e).

The labrum is all flat in the smallest males of *quadricolor*, and such individuals can be recognized by the combination of a narrow clypeal lip (corners closer to each other than to orbit, Fig. 308b), sparsely punctate fore- and midfemoral venters (Fig. 308d), and all or largely red gaster and legs. The inclined (and not appressed) setae of sterna IV–VI help in recognition (Fig. 308e).

FIGURE 306. *Tachysphex quadricolor* (Gerstaecker): female from Namibia in lateral view.

FIGURE 307. *Tachysphex quadricolor* (Gerstaecker): female from Tanzania in lateral view.

JUSTIFICATION OF NEW SYNONYMY.— *T. depilosellus* var. *fallax*, one of several color forms of *quadricolor*, does not warrant a nomenclatural status of its own.

TYPE LOCALITY.— Turner (1917a) gave Pakasa, Northern Rhodesia (now Zambia), as the type locality of *Tachysphex depilosellus*, but I could not find it in the available maps and gazetteers. He also mentioned Pakasa in the original descriptions of *Paranysson helioryctoides* Turner, 1912, *Paranysson oscari* Turner, 1914, and *Tachytes silverlocki* Turner, 1917 and "Pakasa, Zambesi River" in the original description of *Gastrosericus lamellatus* Turner, 1912. The collector, Oscar C. Silverlock, was recommended by the British Museum in January 1910 to the British South African Company as an entomologist for the Northern Rhodesia Expedition (Donald Baker's letter of 11 December 1999). He went there to investigate the tsetse fly "and other noxious insects" and drowned in the Zambezi River when his boat was capsized by a hippopotamus on 22 March 1911 (F.D. Morice. *The Transactions of the Entomological Society of London* for 1911. Proceedings:cxxI–cxxii). Donald Baker (his letter of 7 March 2003) has seen specimens collected by Silverlock and labeled '70 miles W of Kariba Gorge' (now the bottom of the Kariba Lake) and 'N. Rhodesia, Algoa, 3 May 1910'. The latter was a fort and trading post at the confluence of

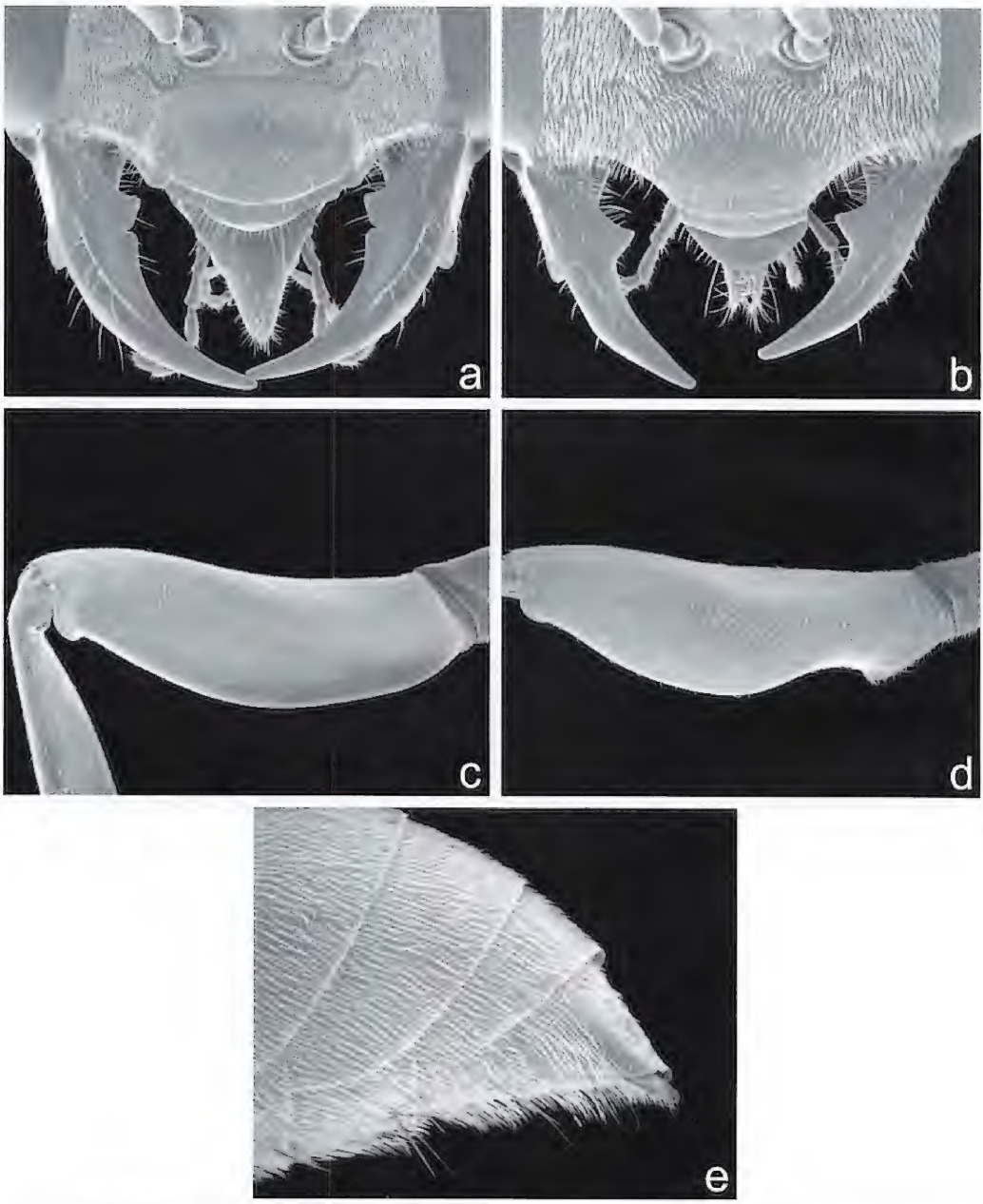


FIGURE 308. *Tachysphex quadricolor* (Gerstaecker): a – female clypeus and mandible (×27); b – male clypeus and mandible (×39); c – female forefemur showing sparse punctation of the posteroventral surface (×29); d – male forefemur showing sparse punctation of the posteroventral surface (×44); e – apical portion of male gaster in lateral view showing suberect sternal setae (×60).

Lunsemfwa and Lukusashi rivers (14°39′S 30°00′E) at the turn of the XIXth and XXth centuries, then occupied as a farm, and abandoned in the early 1920s.

Description.— Labrum varying: convex and slightly protruding beyond clypeal free margin in most specimens, but flat, barely protruding in smallest males. Galea minutely, sparsely punctate, as long as 0.7 of scape. Scutal punctures less than one diameter apart. Mesopleuron dull, evenly microsculptured. Propodeal dorsum evenly microareolate, side ridged in female and many males, but uniformly microareolate in some males. Fore- and midfemoral venters with large punctures that are several to many diameters apart (Figs. 308c, d). Hindcoxal dorsum with inner margin carinate at least basally.

Setae appressed on postocellar area and scutum; nearly appressed on each side of oral fossa next to occipital carina; appressed or nearly so on mesopleuron beneath scrobe except suberect in many Ethiopian specimens; on propodeal dorsum oriented mostly posterad, but oriented toward midline near base (apicomedian area glabrous except dorsum setose throughout in most Ethiopian individuals).

Head black, mandible reddish except dark apically. Frontal setae silvery in female, golden in male. Coloration of antenna, thorax, wings, and coxae: see Variation below. Femora all red or black basally. Tibiae and tarsi red. Gaster all red in most specimens, but partly black in some (black are: female tergum IV all or partly, and in the male: terga IV–VII in specimens from Zimbabwe and one from Rundu area, Namibia; segments III–VII in single male from Graafwater, South Africa; sternum II apically, sternum III, tergum III apically, and segments IV–VII in a specimen from Willowmore, South Africa). Terga I–III apically with rudimentary silvery fasciae.

♀.— Clypeus (Fig. 308a): bevel markedly longer than basomedian area; lip conspicuously arcuate, sinuous or incised laterally. Width of postocellar area 1.0–1.3 × length. Dorsal length of flagellomere I 2.5–2.8 × apical width. Midtrochanteral venter shiny, with only a few, sparse punctures. Dorsal foretibial surface with two spines; outer surface with two spines, exceptionally three. Forebasitarsus with seven or eight rake spines. Tergum V finely punctate throughout, including apical depression. Pygidial plate conspicuously microsculptured between punctures, punctures averaging many diameters apart. Length 10.4–14.0 mm.

♂.— Mandible: trimmal carina with tooth, at most with rudimentary cleft. Clypeus (Fig. 308b): middle section markedly convex; bevel about as long as basomedian area; lip free margin arcuate or sinuate, with well-defined corner; distance between corners 0.7 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 2.2–2.6 × apical width. Forefemoral notch microsculptured, asetose. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna IV–VI with dense, inclined setae that are about one midocellar diameter long (Fig. 308e), more than that in Ethiopian, Kenyan, and Tanzanian populations. Length 6.8–14.0 mm. Volsella and penis valve: Figs. 309c, d.

Variation.— Specimens from various areas differ markedly in color, as described below. In southern Africa, they become progressively darker toward the north.

Clypeus: all black in many specimens from Zambia, Namibia, some from Zimbabwe, and those from Willowmore, South Africa; with the bevel yellowish red in other specimens from those countries; and all red in specimens from Eritrea, Ethiopia, Kenya, Tanzania.

Antenna: all black in many specimens, but scape all reddish in most those from South Africa and one from Botswana; also pedicel and flagellomere I reddish in females and some males. Scape through flagellomere II are red in the holotype of *quadricolor* and in Eritrean and some Ethiopian specimens.

Thorax: all black (most specimens) or partly red (Ethiopian and Tanzanian specimens, Kenyan

males, some females from the former Transvaal, South Africa). In the females from Transvaal, the red can include most of the pronotal dorsum and scutum anteriorly. In the Ethiopian, Kenyan, and Tanzanian specimens, red are the pronotum, anterior part of scutum (only narrow posterior portion black in some specimens), scutellum (except black axilla), metanotum, mesopleuron at least anteriorly (only mesothoracic venter black mesally in some specimens); the propodeum is all black or the dorsum is red laterally.

Wings: conspicuously, uniformly infumate, with violet shimmer (Figs. 306, 309a), in specimens from Zambia and in females from Zimbabwe, Namibia, and Willowmore, South Africa, with forewing costal vein dark brown and subcostal vein black. The females from Botswana and one from Namibia have the wings conspicuously infumate, the costal vein brown and the subcostal vein dark brown. Specimens from Mozambique and former Transvaal and also males from Angola, Namibia, and Zimbabwe have the wings yellow in the basal two thirds, infumate in the apical third (but weakly so in some males from Namibia), and both costal and subcostal veins reddish brown. Eritrean, Ethiopian, Kenyan, and Tanzanian specimens are similar, but the difference in color between the basal and the apical wing portions is even greater (Figs. 307, 309b). Finally, the wings are uniformly yellow in most specimens from the Eastern Cape, Northern Cape, and Western Cape provinces of South Africa (but uniformly infumate in a male from Willowmore and two from Lambert's Bay area).

Coxae and trochanters: black in most specimens, but red in Ethiopian, Kenyan, and Tanzanian populations.

Geographic distribution (Fig. 310).— Eritrea and Ethiopia to Angola and South Africa.

Records.— ANGOLA: Bruco (2 ♂, BMNH). **BOTSWANA**: 18 mi NE Kalkfontein (1 ♀, BMNH), Nathane (1 ♀, AEI). **ERITREA**: Keren (1 ♂, GENOVA, determined as *Lyrops quadricolor* by P. Magretti). **ETHIOPIA**: **Sidamo**: 26 km N Moyale (1 ♀, 20 ♂; 2 ♂, AAU), 35 km N Moyale (2 ♂), 63 km S Yabelo (1 ♂). **KENYA**: **Coast Province**: ca 10 km N Taita Discovery Centre (2 ♂). **MOZAMBIQUE**: Inhaca Island (1 ♂, AMG), Maputo (1 ♂, BMNH), no specific locality (1 ♀, ZMHU, holotype of *quadricolor*). **NAMIBIA**:

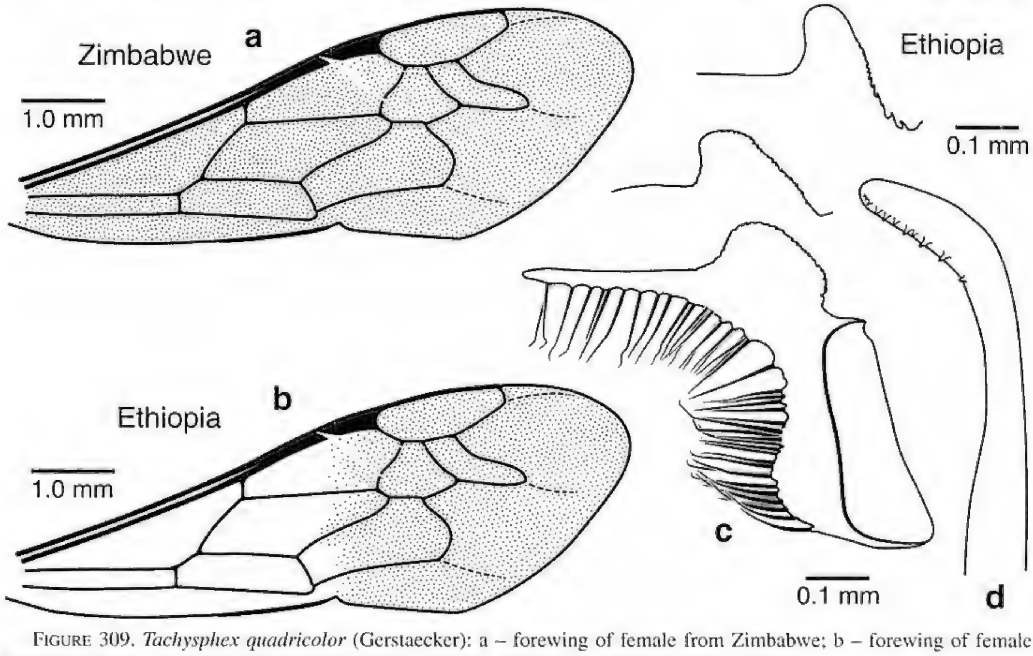


Figure 309. *Tachysphex quadricolor* (Gerstaecker): a – forewing of female from Zimbabwe; b – forewing of female from Ethiopia; c – volsella with outlines showing variation of dorsal process; d – penis valve.

Karasburg District: Farm Altdorn 3 30 km NE Ai Ais at 27°48′16″S 17°40′02″E (1 ♂; 1 ♂, CSE). **Karibib District**: Khan River 23 km N Karibib (2 ♀, 2 ♂). **Okahandja District**: Okahandja (1 ♀, AMG), Waldau River 17 km W Okahandja (2 ♀, 2 ♂; 1 ♀, 1 ♂, NMN). **Otjiwarongo District**: 18 km NE Kalkfeld (1 ♂), 25 km NE Kalkfeld (1 ♀), 20 km NE Otjiwarongo (1 ♂, MS). **Rundu District**: Rundu (1 ♀; 1 ♀, MS), 100 km SW Rundu (1 ♀, 1 ♂, JG). **SOUTH AFRICA**: **Eastern Cape Province**: Steynsburg (1 ♂, SAM), Willowmore (1 ♀, 1 ♂, SAM, lectotype and paralectotype of *fallax*; 2 ♂, TMP). **Kwazulu-Natal**: Manguzi River near Maputa (1 ♀, AMG). **Mpumalanga**: Pretoriuskop in Kruger National Park (1 ♀, PMA), Skukuza in Kruger National Park (1 ♀, PMA). **Northern Province**: Beacon Ranch 20 km NW Gravelotte (1 ♀, AMG), Guernsey Farm 15 km E Klaserie (2 ♂; 1 ♀, 2 ♂, PMA), Phalaborwa (1 ♂, FSCA). **North-West Province**: Vryburg (1 ♂, SAM). **Western Cape Province**: Graafwater (1 ♀, FSCA), 5 km S Lambert's Bay (2 ♂, OÖLM), Murraysburg District (1 ♂, SAM). **Location unknown**: Kruger National Park: no specific locality (1 ♂, AMG). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe (1 ♂), 2 km NE Mkomazi (1 ♀, 4 ♂). **ZAMBIA**: 30 km W Livingstone (1 ♀, OÖLM), Pakasa (2 ♀, BMNH, lectotype and paralectotype of *depilosellus*), locality of unknown location. **ZIMBABWE**: Bulawayo airport (1 ♀, 2 ♂), 11 km NE Nyamandhlovu (1 ♀, 1 ♂), Redbank at Kami River (1 ♀, 1 ♂), Victoria Falls (1 ♀, 9 ♂).

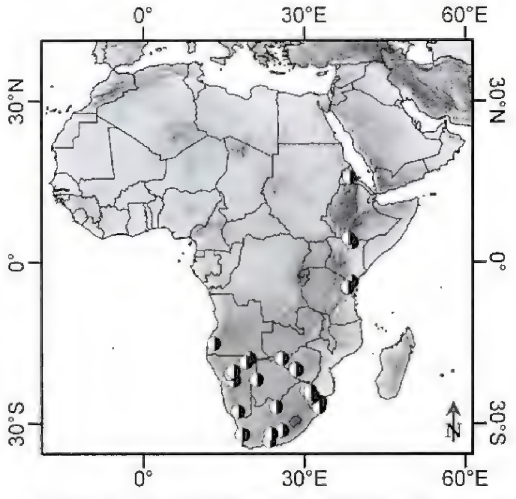


FIGURE 310. Collecting localities of *Tachysphex quadricolor*.

Tachysphex ramses Pulawski

Figures 304, 311, 312.

Tachysphex ramses Pulawski, 1971:297, ♀, ♂. Holotype: ♀, Egypt: Manshiet Radwan near Ghiza (USNM), examined.— Bohart and Menke, 1976:276 (listed).

RECOGNITION.— *Tachysphex ramses*, known only from two localities in Lower Egypt, has a markedly convex labrum, but unlike other such species its frons is markedly prominent (Figs. 311c-f). Subsidiary characters include: foretarsomere II expanded apicolaterally (Figs. 311g, h), with the apical rake spines originating on the tarsomere's ventral surface rather than on the lateral margin; in the female, the clypeal free margin nearly straight between the lobe and orbit (Fig. 311a), inner mandibular margin without tooth (Fig. 311a), flagellomeres III–X reddish brown, and posteroventral hindfemoral surface and outer hindtibial surface with dense setae that conceal the integument; in the male, outer apical spine of foretarsomere II almost twice as long as tarsomere III and volsella without dorsal process (Fig. 312).

DESCRIPTION.— Frons conspicuously prominent (Figs. 311c–f). Labrum convex, markedly protruding from beneath clypeus. Galea microreticulate and punctate, longer than wide in profile, as long as 0.9 of scape. Scutal punctures somewhat ill defined, less than one diameter apart. Mesopleuron uniformly microsculptured (integument largely concealed by vestiture). Propodeal dorsum evenly microareolate; side not ridged. Foretarsomere II (also foretarsomere I in female) expanded apicolaterally (Figs. 311g, h), with apical rake spines originating on tarsomere's ventral surface. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum; in female fully concealing integument on mesothorax, propodeal dorsum, hindfemoral outer surface (except dorsally and basally), and

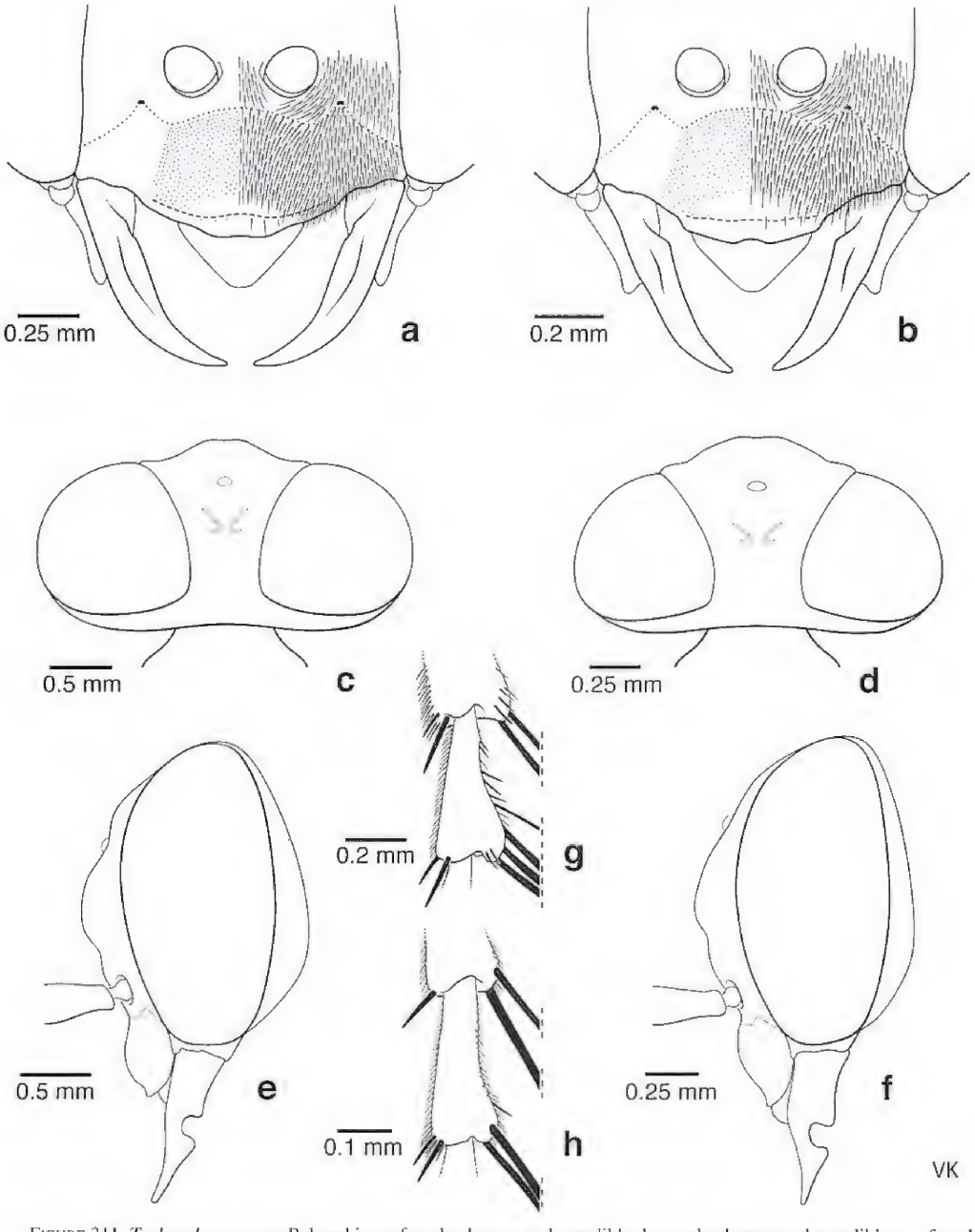


FIGURE 311. *Tachysphex ramses* Pulawski: a – female clypeus and mandible; b – male clypeus and mandible; c – female head in dorsal view; d – male head in dorsal view; e – female head in lateral view; f – male head in lateral view; g – female foretarsomere II; h – male foretarsomere II.

hindtibial dorsum; about as long as midocellar diameter on each side of oral fossa next to occipital carina; on propodeal dorsum forming a complicated pattern: lateral setae diverging posterad, adlateral setae converging posterad and meeting posteromesally, admedian setae converging anterad near base and converging posterad in apical half or so; propodeal side all setose.

Head and thorax black, clypeal bevel and mandible (except apically) yellowish red, labrum reddish, female scape reddish and flagellomeres III–X reddish brown. Frontal setae silvery in both sexes. Wing membrane hyaline; all veins pale yellow. Femora red in female, black (except apically) in male; tibiae and tarsi red. Gaster red except male segments IV–VI black and tergum VII darkened (incorrectly described in Pulawski, 1971). Terga I–V in female, I–IV in male, silvery fasciate apically (male terga V and VI each with rudimentary fascia).

♀.— Clypeus (Fig. 311a): bevel markedly shorter than basomedian area; lip free margin arcuate, not emarginate mesally, neither incised nor sinuous laterally. Width of postocellar area about 1.1 × length. Dorsal length of flagellomere I 2.5–2.8 × apical width. Foretibial outer surface with three spines. Forebasitarsus with seven rake spines. Apical spines of hindtarsomere IV reaching claw bases. Apical depression of tergum V finely punctate and setose. Pygidial plate microreticulate, dull, with a few, sparse punctures several or many diameters apart. Length 9.5 mm.

♂.— Mandible: trimmal carina with low tooth, without cleft. Clypeus (Fig. 311b): bevel markedly shorter than basomedian area; lip free margin arcuate, with obtuse corner; distance between corners 1.3 × distance between corner and orbit; oblique carina emerging from lip corner rudimentary, not extending onto bevel; free margin of clypeal lateral section almost straight. Width of postocellar area 1.4 × length. Dorsal length of flagellomere I 2.0 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with four rake spines on one leg and five on other in single specimen examined. Outer apical spine of foretarsomere II almost twice as long as tarsomere III. Length 6.0 mm. Volsella and penis valve: Fig. 312.

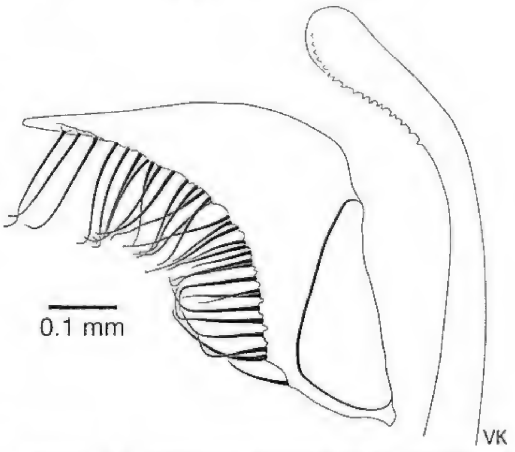


FIGURE 312. *Tachysphex ramses* Pulawski: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 304).— Lower Egypt.

RECORDS.— **EGYPT**: **Al Jizah** (= Ghiza): Manshiet Radwan (1 ♀, 1 ♂, USNM, holotype and paratype of *ramses*). **Location unknown**: Beni Yussef (Pulawski, 1971).

Tachysphex rapax Pulawski, sp. nov.

Figures 313, 314.

DERIVATION OF NAME.— *Rapax*, Latin for grasping, greedy; a name resembling *harpax*, an allusion to the similarity of these two species.

RECOGNITION.— Like *scopa*, the female of *rapax* has conspicuous, sinuous setae on the lower gena, postocellar area, scutum anteriorly, mesopleuron, propodeum, and fore- and midfemora, and conspicuously modified tarsi. In particular, tarsomeres IV have the dorsoapical emargination rounded proximally (as in Fig. 179a), tarsomeres V and claws are unusually long (as in Figs. 179b, c), and tarsomeres V have at least one preapical spine on venter, at least one spine on each lateral margin, and the apicoventral margin produced into a lobe (as in Fig. 179c). The female of *rapax* differs

in having a black gaster (gastral apex reddish), unridged propodeal side, and wider clypeal lobe (corners closer to adjacent orbit than to each other). In *scopa*, the gaster is all red, the propodeal side is ridged, and the clypeal lobe is narrow (corners closer to each other than to adjacent orbit).

The male of *rapax* also has conspicuous, sinuous setae on the lower gena, postocellar area, scutum anteriorly, mesopleuron, propodeum, and on the fore- and midfemora, and is further characterized by an unridged propodeal side, sterna evenly, densely setose, forebasitarsus without rake, and hindwing cu-a vertical. It has a postocellar area about as long as wide or wider (width 1.1–1.3 × length), propodeal dorsum microscopically rugose to ridged (Fig. 313c), gaster black, and venter of apical tarsomeres with one or several small spines. *Tachysphex gagates* is similar, but differs in having a postocellar area longer than wide (width 0.7–0.8 × length), propodeal dorsum unsculptured or aciculate, except for sparse, microscopic punctures, gaster red, midfemoral venter with appressed setae, and venter of apical tarsomeres without spines.

Relationships to *Tachysphex harpax*.— Except for its partly sinuous and erect setae, *rapax* closely resembles *harpax* but the two do not appear to intergrade. Therefore, I treat them as separate species.

Description.— Setae emerging from free margin of labrum unusually stout (as in Fig. 178c). Galea in profile slightly longer than wide, about as long as 0.6 of scape. Scutal punctures varying on disk from 1–2 up to several diameters apart, interspaces microsculptured, dull. Mesopleural punctures ill defined, averaging more than one diameter apart; interspaces microsculptured, dull. Propodeal dorsum varying from finely rugose to ridged (ridges well defined, diverging posterad in

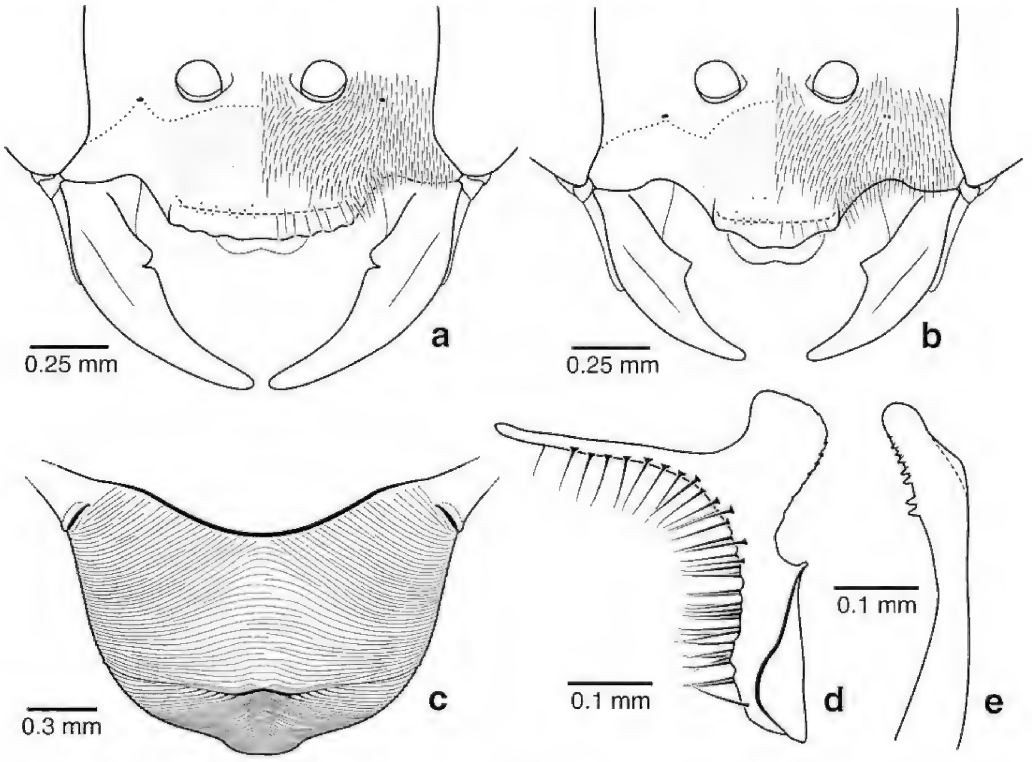


Figure 313. *Tachysphex rapax* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum showing sculpture; d – volsella; e – penis valve.

basal half and transverse near apex, Fig. 313c); side uniformly microsculptured, with minute, sparse punctures. Hindcoxal dorsum with inner margin carinate basally.

Setae (numbers in parentheses represent setal length expressed as fractions of basal mandibular width): sinuous and erect on each side of oral fossa (0.5–0.6) and on postocellar area (0.5); sinuous and suberect on scutum anteriorly (0.5), on mesopleuron, forecoxa, forefemur, and midfemoral venter (up to 0.6); oriented posterad on propodeal dorsum.

Head and thorax black, mandible reddish except basally and apically. Frontal setae silvery in female, with golden tinge in upper half in male. Wing membrane almost hyaline; costal vein of forewing light brown, subcostal vein brown. Femora black in female except red apically (hindfemur nearly all red in one Kenyan female); male femora red to black (except apically). Tibiae and tarsi red. Gaster black except female pygidial plate red (all or apically); also sternum VI in some specimens; tergum VII reddish in many males. Terga I–IV silvery fasciate apically.

♀.— Free margin of labrum shallowly emarginate mesally. Clypeus (Fig. 313a): bevel about as long as basomedian area; lip free margin arcuate, slightly emarginate mesally, laterally simple or with ill-defined incision. Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 1.7–1.8 × apical width. Scutellum somewhat flattened. Dorsal foretibial surface with a few suberect, inconspicuous bristles; outer surface with thin, erect bristles. Forebasitarsus with 17 or 18 rake spines. Length of fore- and midtarsomeres II about 1.8 and 2.2 × apical width, respectively; that of midtarsomere III 1.0–1.2 × apical width; and of fore-, mid-, and hindtarsomeres IV about 0.8, 0.8, and 0.9–1.0 × apical width, respectively. Dorsoapical emargination of tarsomeres IV rounded proximally (as in Fig. 179a). Apical tarsomeres markedly elongate, with at least one preapical spine on venter (mostly with cluster of such spines); apicoventral margin produced into lobe (as in Fig. 179c); each lateral margin with row of erect setae, with one or two spines near midlength. Claws markedly elongate, outer claw in each pair slightly shorter and thinner than inner claw (opposite on foretarsus). Apical depression of tergum V impunctate and asetose (except mesally). Pygidial plate with several punctures that average many diameters apart; interspaces practically unsculptured. Length 6.8–8.7 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 313b): bevel as long as basomedian area or shorter, delimited anterolaterally by short, obtuse, longitudinal carina that emerges from each lip corner; lip free margin broadly, obtusely produced mesally, with well-defined corner; distance between corners 0.8–0.9 × distance between corner and orbit. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width. Forefemoral notch with bottom microscopically setose. Length of midtarsomeres III and IV 1.5 and 0.8 × apical width, respectively. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with one or up to several preapical, minute spines. Sternum VIII tridentate apically or with broad median projection. Length 6.0–7.2 mm. Volsella and penis valve: Figs. 313d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 314).— Kenya, Tanzania.

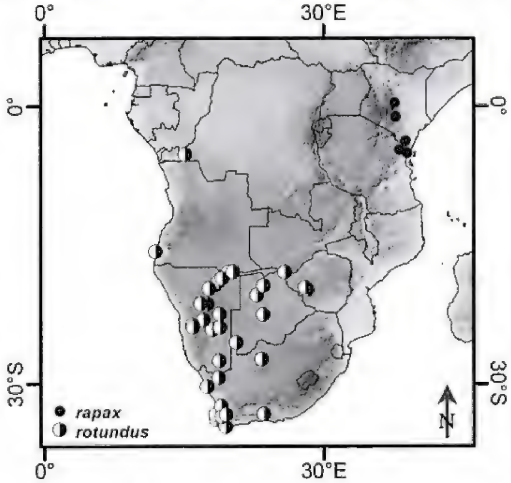


FIGURE 314. Collecting localities of *Tachysphex rapax* and *rotundus*.

Records.— Holotype: ♀, **KENYA**: **Eastern Province**: 94 km E Thika, 6 July 1999, WJP and J.S. Schweikert (CAS). Paratypes: **KENYA**: **Coast Province**: Taita Discovery Centre, Edwin Selempo, 15 Sept (2 ♀, 1 ♂) and 30 Sept 2001 (1 ♂). **Eastern Province**: same data as holotype (1 ♂); 5 km NNE Isiolo, 8–10 June 2000, M.H. Bourbin, V.F. Lee, and WJP (1 ♂). **TANZANIA**: **Tanga Region**: 73 km NW Korogwe, Omary S. Haji and WJP, 11–12 July 2001 (1 ♀, 2 ♂), 14–15 July 2001 (2 ♀, 4 ♂), 18 July 2001 (1 ♂), 19–20 July 2001 (1 ♀, 1 ♂); 10 km WNW Mabokweni, 12 Jan 2003, WJP (4 ♂); same locality, 15–18 Jan 2003, M.A. Prentice (1 ♀).

***Tachysphex rhacodes* Pulawski, sp. nov.**
Figures 315–317.

Derivation of name.— *Rhacodes*, Greek for wrinkled; with reference to the ridged scutum of this species.

Recognition.— *Tachysphex rhacodes* has a distinctive scutum that is dull, minutely, densely punctate, and longitudinally ridged in at least the posterior half (Figs. 315e, 316c); the ridges are evanescent anteriorly but well defined next to the scutal hindmargin. The scutum is also longitudinally ridged in *plicosus* and most *tryssus*, but only next to the scutal hindmargin (the ridges are no longer, or at most slightly longer, than the midocellar diameter). Subsidiary recognition features of *rhacodes* are: supraantennal swelling in the vast majority of specimens uniformly, minutely punctate, like the rest of the frons (Fig. 316a); mesopleuron in many specimens rugose; scutal setae appressed; and body black.

Description.— Galea unsculptured or with a few, sparse punctures, longer than wide in profile, as long as 0.8 of scape. Frons dull, minutely punctate (punctures inconspicuous, markedly smaller than on postocellar area); supraantennal swelling in most specimens punctate like remaining frons (Fig. 316a), but punctures sparser in single male from Serenje area, Zambia. Scutum dull, uniformly microscopically punctate (punctures nearly contiguous), with longitudinal ridges in at least posterior half (Figs. 315e, 316c); ridges evanescent anteriorly, but well defined adjacent to scutal hindmargin. Mesopleuron rugose in most populations (Fig. 316b), but punctate, with nearly linear interspaces and only a few, rudimentary rugae in females and many males from 73 km N Korogwe, Tanzania. Propodeal dorsum coarsely rugose to irregularly, longitudinally ridged; side ridged. Hindcoxal dorsum with inner margin carinate, carina roundly expanded basally in most specimens, not expanded in single male from Zimbabwe.

Setae subappressed to suberect on postocellar area and on each side of oral fossa next to occipital carina, shorter than midocellar diameter; appressed on scutum; oriented anterad on propodeal dorsum (except basomedially); suberect on midfemoral venter.

Head, thorax, gaster, and legs black except apical tarsomeres brown in male. Frontal setae silvery except pale golden in many males. Wing membrane nearly hyaline to slightly infumate; forewing costal and subcostal veins brown. Terga I–IV or I–V fasciate apically; fasciae silvery except golden in several males.

♀.— Clypeus (Fig. 315c): bevel shorter than basomedian area; lip free margin arcuate, emarginate mesally, with two incisions or sinuosities on each side (i.e., with three pairs of teeth). Width of postocellar area 1.1–1.2 × length (Fig. 315a). Dorsal length of flagellomere I 1.4–1.6 × apical width. Dorsal foretibial surface with one or two thin setae; outer surface with at most a few suberect bristles. Forebasitarsus with 8–12 rake spines. Length of midtarsomere II 1.8 × apical width in most populations, but 2.3 × width in specimens from 73 km N Korogwe, Tanzania. Tarsomeres IV slightly wider than long (Fig. 316d) except slightly longer than wide in specimens from Korogwe. Tergum V densely micropunctate, including apical depression. Pygidial plate aciculate, sparsely punctate. Length 6.0–8.7 mm.

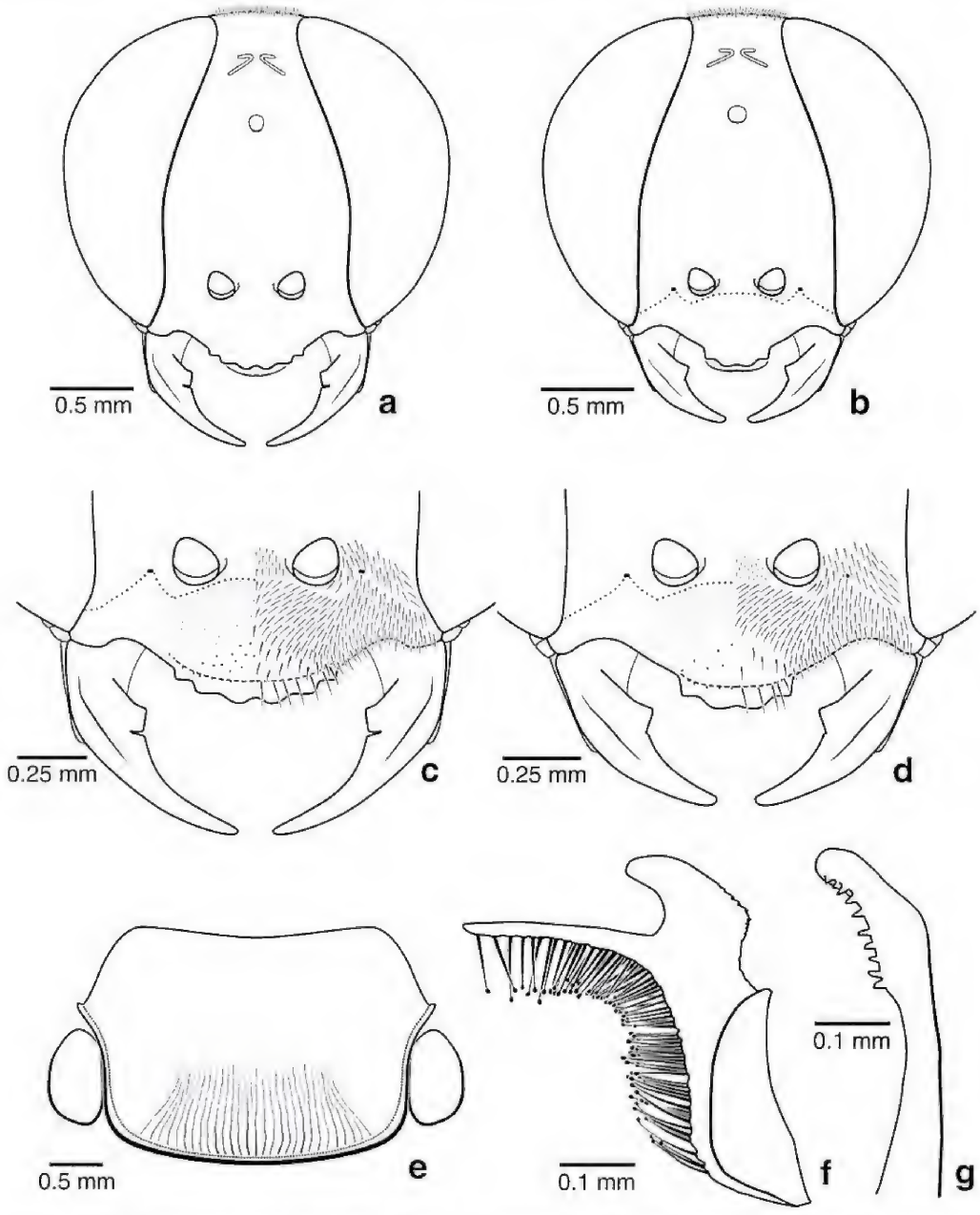


FIGURE 315. *Tachysphex rhacodes* Pulawski, sp. nov.: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – scutum; f – volsella; g – penis valve.

♂.— Mandible: trimmal carina with conspicuous tooth, at most with rudimentary cleft. Clypeus (Fig. 315d): bevel absent or ill defined and markedly shorter than basomedian area; lip free margin varying from slightly projecting mesally to slightly emarginate mesally, with well-defined corner; distance between corners 0.5–0.8 × distance between corner and orbit. Width of postocellar

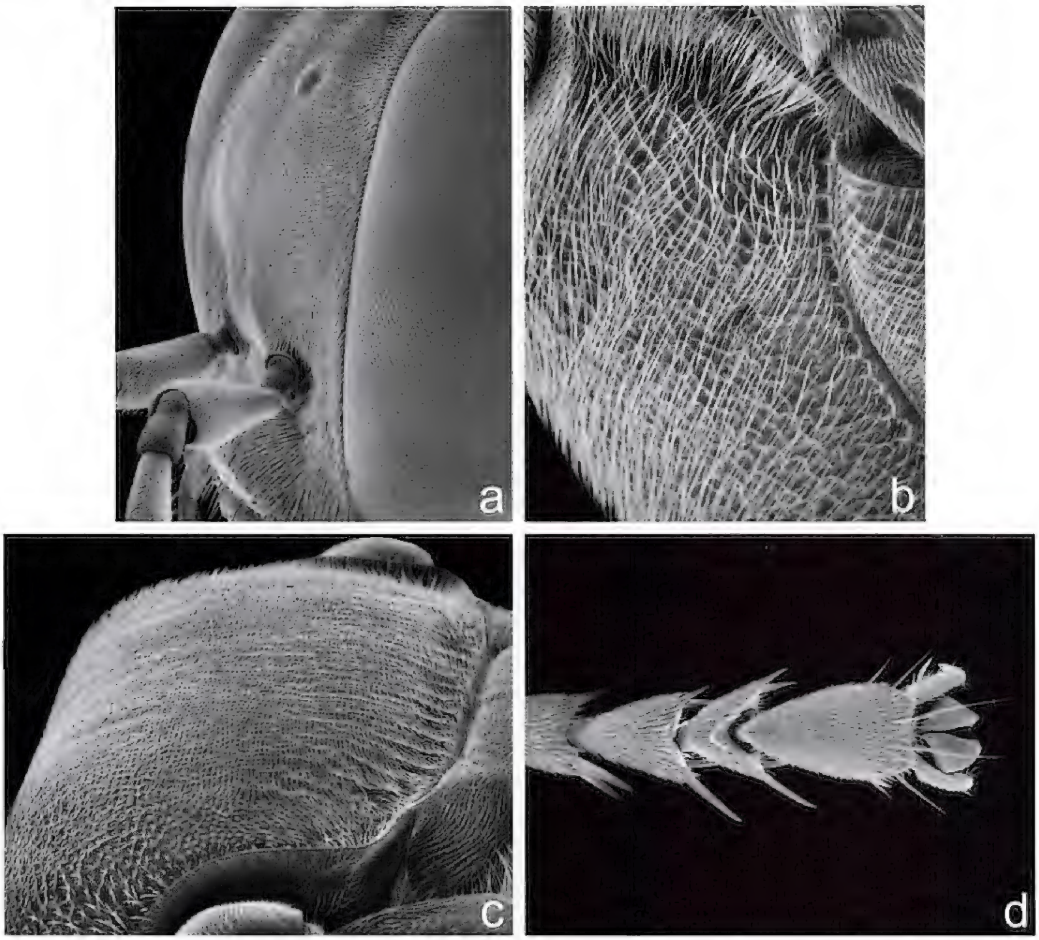


FIGURE 316. *Tachysphex rhacodes* Pulawski, sp. nov.: a – female frons in lateral oblique view (×42); b – female mesopleuron seen obliquely from behind (×72); c – female scutum seen obliquely from behind (×72); d – female midtarsomeres III–V (×60).

area about 1.1–1.4 × length (Fig. 315b). Dorsal length of flagellomere I 1.5 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length of midtarsomere II 1.5–1.7 × apical width in most populations (2.0–2.2 × in specimens from 73 km N Korogwe, Tanzania), that of midtarsomere III 1.0–1.3 × apical width. Length of hindtarsomere II 1.6–1.8 apical width. Sternum VIII tridentate apically. Length 6.5–7.0 mm. Volsella and penis valve: Figs. 315f, g.

NESTING BEHAVIOR.— *Tachysphex rhacodes* occurs in a variety of habitats, ranging from deserts (e.g., eastern Ethiopia) to forests (eastern Zambia). I found a nesting colony in a forest adjacent to Wildlife Camp, 7 km SW Mfuwe, Zambia, across the river from South Luangwa National Park, on 7 March 1998. The forest floor was flat, partly wet, with footprints of elephants, hippopotami, impala antelopes, and baboons. The colony itself was in a dry, sandy-loam, vegetated area, exposed to the sun. I noticed a female at 11:37 a.m. as she started digging a nest. She used her forelegs for excavating the ground, as is typical for the genus. As she proceeded, a mound of exca-

vated soil accumulated on three sides of the entrance. The female reappeared on the surface every 3–7 seconds (head toward the hole), projecting the soil from under her body. Occasionally she went back to the mound, leveling it slightly. She performed an orientation flight at 11:53 and went hunting, leaving the nest entrance open. She flew back at 12:17 with an acridid prey and went directly inside the nest, leaving the prey at the entrance. She dragged it inside a while later. I collected her as she came out a short time afterward. I started excavating the nest (the gallery started at a shallow angle) and soon discovered the prey (8.5 mm long) and three other acridid prey (easily recognizable by their larger size, 9.5–11.0 mm). The prey were incompletely paralyzed, and the latest one could even stand in the normal position. I do not know if all four prey came from the same cell. The female may have added the smaller nymph to a cell that she had begun provisioning either the same morning or the previous day. However, the excavating activity (i.e., opening of the previously closed nest) that I noticed suggests that the latest prey was put in a new cell, that the three larger prey were stored in a fully provisioned cell, and that I lost the wasp egg as I dug out the nest. Two prey are Catantopinae and two are Acridinae (det. D.C. Rentz), all of them second or third instar nymphs.

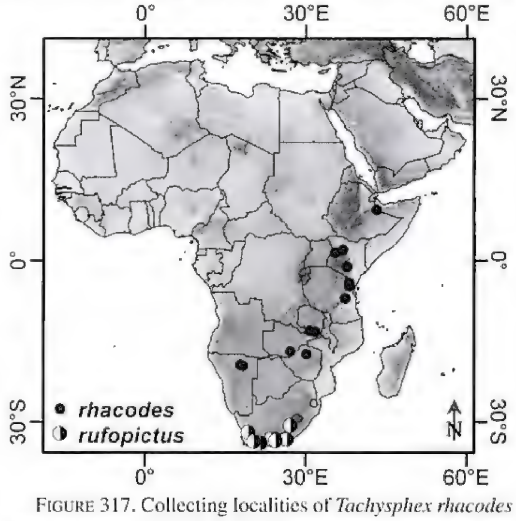


FIGURE 317. Collecting localities of *Tachysphex rhacodes* and *rufopictus*.

GEOGRAPHIC DISTRIBUTION (Fig. 317).— Ethiopia to Zimbabwe and Namibia.

RECORDS.— HOLOTYPE: ♀, **ZAMBIA**: **Eastern Province**: Wildlife Camp at Luangwa River 7 km SW Mfuwe, 7–9 Mar 1998, WJP (CAS). PARATYPES: **ETHIOPIA**: **Harerge**: 44 km ENE Jijiga, 26 Aug 1997, V. Ahrens, WJP, Emiru Seyoum (1 ♂). **KENYA**: **Eastern Province**: 5 mi SW South Horr on S side of Nyiru Range, 22–28 Jan 1973, J.P. Donahue (1 ♂, LACM); 94 km E Thika, 10–11 Dec 2002, WJP (2 ♂). **Rift Valley Province**: Marich Pass Field Studies Centre, 13–14 June 2000, M.H. Bourbin, V.F. Lee, and WJP (1 ♂). **NAMIBIA**: **Grootfontein District**: 10 km NE Grootfontein, 27–31 Mar 1997, M. and O. Niehuis (3 ♂, OHL). **Tsumeb District**: 10 km SE Tsumeb, 8 Mar 1990, MS (1 ♂, MS), WJP (2 ♀, 2 ♂). **TANZANIA**: **Kilimanjaro Region**: Mkomazi Game Reserve: Kikolo Plot, 25 Nov–5 Dec 1995, S. van Noort (1 ♂, SAM). **Morogoro Region**: 48 km W Morogoro, 18 June 2001, M.H. Bourbin and W.J. Pulawski (2 ♂). **Tanga Region**: 73 km NW Korogwe, M.H. Bourbin and WJP, 27 June 2001 (1 ♀), Omary S. Haji and W.J. Pulawski, 11–12 July 2001 (7 ♀, 3 ♂; 2 ♀, 1 ♂, BMNH), 14–15 July 2001 (5 ♀, 7 ♂; 2 ♀, 2 ♂, SAM), 18 July 2001 (7 ♀, 1 ♂; 1 ♀, OHL; 5 ♀, UCD; 1 ♀, USNM), 19–20 July 2001 (5 ♀, 8 ♂; 1 ♂, OHL; 1 ♂, UCD; 1 ♀, USNM). **ZAMBIA**: **Eastern Province:** 6–18 km SW Mfuwe, 20–22 Mar 1995, WJP (1 ♀, 2 ♂), Wildlife Camp at Luangwa River 7 km SW Mfuwe, 7 Mar 1998, WJP (9 ♀). **Northern Province**: 82 road km NE Serenje, 22 Mar 1998, WJP (1 ♂). **Southern Province**: 5 km E Choma, 11 Mar 1995, WJP (1 ♂). **ZIMBABWE**: 15 km NW Chinhoyi, 11 Apr 1985, J. Gusenleitner (1 ♂).

Tachysphex rhodesianus Bischoff

Figures 318–320.

Tachysphex panzeri rhodesianus Bischoff, 1913b:64, ♂. Holotype: ♂, Zimbabwe: Bulawayo (ZMHU), examined.— As *Tachysphex panzeri* race *rhodesianus*: Arnold, 1923:170 (new status, revision, description of ♀), 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex rhodesianus*: Arnold, 1947:147 (new status); Bohart and Menke, 1976:276 (listed).

Recognition.— *Tachysphex rhodesianus* has a convex labrum (protruding beyond the clypeal free margin), elongate galea (length equal to about 0.9 of scape), propodeal dorsum with a glabrous apicomedian area, and the adjacent setae oriented posterad. In addition, the clypeal lip is incised laterally in the female and with a well-developed corner in the male, the wing membrane is yellowish (brownish in distal third), the costal and subcostal veins are reddish, and setae are suberect on male sterna III–VI.

Tachysphex rhodesianus is similar to *brinckerae*, but has the gaster all red or at least the gastral base and apex red (gastral apex black in *brinckerae*), the thoracic setae are golden and in many specimens also the gastral setae (rather then silvery), tergum IV of many specimens has an apical fascia (only terga I–III fasciate in *brinckerae*), the female is larger (length 15.0–17.0 mm rather than 12.6–13.6), and the male forebasitarsus has 4–6 rake spines (at most one preapical spine in *brinckerae*) and the clypeal lobe is wide (distance between lip corners markedly closer to the adjacent orbits than to each other, while about equidistant in *brinckerae*). In many although not all *rhodesianus* the interspaces between punctures, on the clypeal bevel, are confluent into fine, longitudinal ridges (no such ridges in other *Tachysphex*).

Similar unassigned specimens.— Closely resembling *rhodesianus* are two males from 26 mi SW Nairobi, Kenya (CAS), and six males from Pangani River Camp, Tanzania (CAS). They have a glabrous apicomedian area on the propodeal dorsum, golden cephalic and thoracic setae (thoracic setae largely silvery in one specimen), yellow wings with brown apical portion, suberect setae on sterna III–VI, and a similar volsella. They differ in having an unridged propodeal side (with vestigial ridges in Kenyan specimens), black gastral segments IV–VIII, and a minimally narrower clypeal lobe (distance between lip corners equal to 1.2–1.3 × distance between a corner an orbit, rather than 1.4–1.6 ×).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea closely punctate along posterior margin, sparsely so along anterior margin, as long as 0.9 of scape in female, 1.0 in male. Clypeal bevel, in many specimens, with interspaces between punctures confluent, forming small, longitudinal ridges. Scutal punctures ill defined, no more than one diameter apart. Mesopleuron dull, without well-defined punctures. Propodeal dorsum evenly microareolate; side mostly with well-defined ridges, but ridges evanescent in many males (including holotype). Hindcoxal dorsum with inner margin carinate (except apically), carina not expanded.

Setae appressed on head and thorax except suberect on each side of oral fossa next to occipital carina (slightly longer there than midocellar diameter); basomedian setae of propodeal dorsum oriented anterad, apicomedian area glabrous, with adjacent setae oriented posterad.

Head and thorax black, mandible (except apically) and pronotal lobe reddish. Setae all golden on head and thorax (in both sexes), gastral setae varying from golden to silvery. Wing membrane yellowish except brownish in distal third or so; in forewing both costal and subcostal vein reddish brown (nearly identical in color). Femora, tibiae, and tarsi all red or femora black basodorsally. Gaster red in most females and many males, but segments IV and V black in some females, and in some males either terga V–VII brown or black, or tergum I black basally, or middle terga and most sterna largely black. Terga I–IV with golden or silvery, apical fasciae (only terga I–III fasciate in a female from Matetsi, Zimbabwe).

♀.— Clypeus (Fig. 318a): bevel shorter than basomedian area; lip free margin arcuate, emarginate mesally, incised laterally. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 2.8 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two spines. Forebasitarsus with eight or nine rake spines. Tergum V densely punctate, including apical depression. Pygidial plate with numerous punctures, especially along margins, but largely impunctate mesally; interspaces microareolate. Length 15.0–17.0 mm.

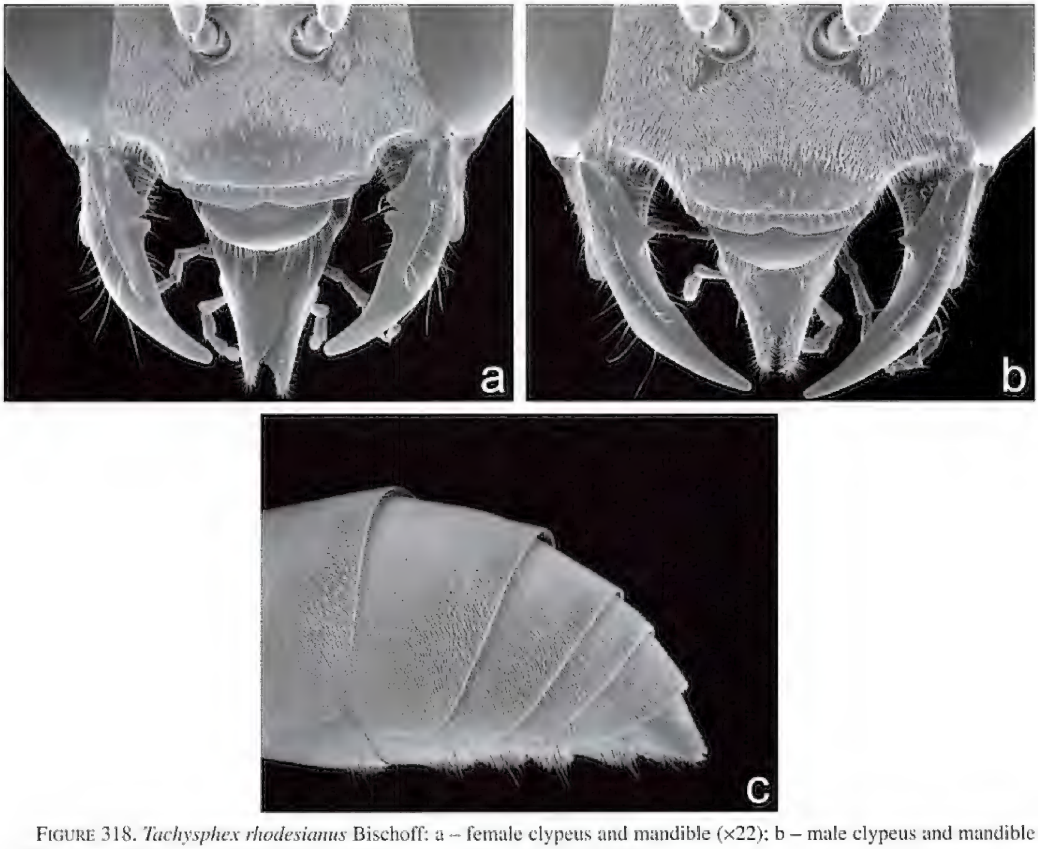


FIGURE 318. *Tachysphex rhodesianus* Bischoff: a – female clypeus and mandible (×22); b – male clypeus and mandible (×18); c – gastral segments II–VII of male showing erect sternal setae (×18).

♂.— Mandible: trimmal carina with prominent, slightly asymmetrical tooth (distal side shorter and steeper than proximal side), at most with rudimentary cleft (Fig. 318b). Clypeus (Fig. 318b): bevel ill defined; lip free margin slightly arcuate, with well-defined, slightly prominent corner; distance between corners 1.4–1.6 × distance between corner and orbit. Width of postocellar area 0.4–0.5 × length. Dorsal length of flagellomere I 2.25–2.5 × apical width. Forefemoral notch relatively small, with microscopic, appressed setae. Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin well defined in distal half, sharp in most specimens. Sterna III–VI with suberect setae (Fig. 318c), about as long as midocellar diameter on sternum III, becoming slightly longer on following sterna. Sternum VIII tridentate apically or with rounded, median lobe. Length 10.0–13.2 mm. Volsella and penis valve: Fig. 319.

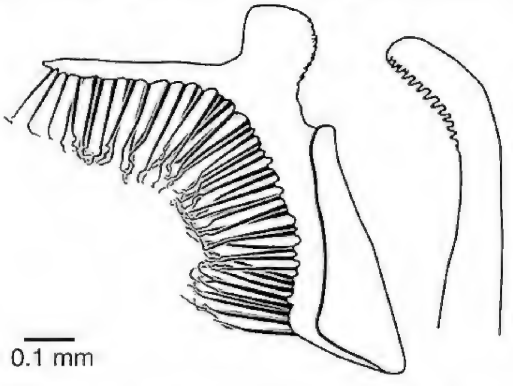


FIGURE 319. *Tachysphex rhodesianus* Bischoff: volsella and penis valve.

Collecting period.— 25 March through 23 May.

Geographic distribution (Fig. 320).— Southern Zambia, Malawi, Zimbabwe, northeastern South Africa.

Records.— **MALAWI**: between Florence Bay and Karonga (2 ♂, BMNH), southern Rukuru River valley (1 ♂). **SOUTH AFRICA**: **Northern Province**: Louis Trichardt (1 ♂). **ZAMBIA**: **Central Province:** 2 km E Mumbwa (1 ♂). **Lusaka Province**: Rufunsa (1 ♂, BMNH). **ZIMBABWE**: Beitbridge (1 ♂, AMG), Bulawayo (8 ♂, SAM; 2 ♂, TMP; 1 ♂, ZMHU, holotype of *rhodesianus*), Bulawayo: Hillside (1 ♂, TMP), Kami Ruins (4 ♀, 11 ♂; 1 ♀, 3 ♂, NHMZ), Lion and Cheetah Park 24 km W Harare (3 ♂), 15 km NW Makuti (= Manyanga) (1 ♀), Matetsi (4 ♀, 1 ♂, SAM), 11 km NE Nyamandhlovu (2 ♂), Sawmills (1 ♀, SAM, Arnold's allotype of *rhodesianus*).

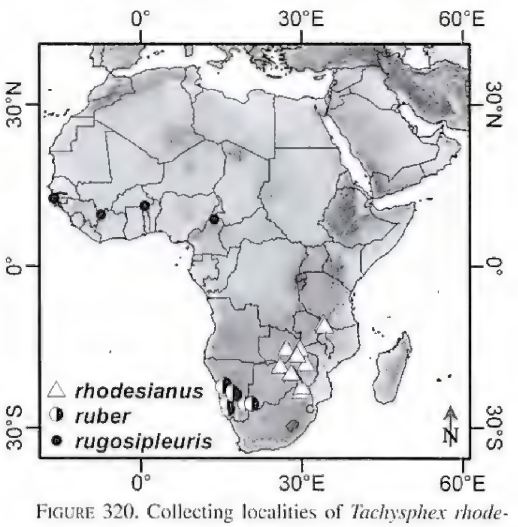


Figure 320. Collecting localities of *Tachysphex rhodesianus*, *ruber*, and *rugosipleuris*.

Tachysphex rotundus Pulawski, sp. nov.

Figures 314, 321.

Derivation of name.— *Rotundus*, Latin for round; with reference to the roundly arcuate clypeal lip.

Recognition.— *Tachysphex rotundus* shares the following combination with several other species: labrum convex, protruding beyond the clypeal free margin; galea elongate (length equal to about 0.6 of scape); propodeal side ridged; upper metapleural pit oblong; cephalic and thoracic setae straight (appressed on the postocellar area and mesopleuron), diverging anterolaterad from the midline on the propodeal dorsum; and male sterna V and VI each with a subbasal, erect fringe of agglutinated setae (fringes visible only when gastral segments are fully extended).

The female of *rotundus* has foretarsomeres I–III slightly broadened apicolaterally (as in *aethiopicus*, *melanius*, *miniatulus*, *ruber*, and *usakos*). Therefore, the rake spines originate from the ventral side (as in Fig. 9c) rather than from the lateral edge. It has a basally red gaster (gaster all black in *melanius*), and the black or dark brown rake spines differentiate it from the remaining four species (proximal basitarsal spines light in some specimens). Also, the clypeal lip is barely emarginate mesally in most specimens (emarginate in *aethiopicus* and *usakos*); the clypeal bevel is narrow (unlike *miniatulus*, the dense clypeal punctation reaches the lip base laterally); and the pygidial plate in most specimens is dull, uniformly microsculptured between punctures, at least basally (shiny, unsculptured between punctures in *aethiopicus*, *ruber*, and *usakos*).

The male of *rotundus*, in addition to the above characters, shares with some *pentheri* a ridged propodeal side and a nonemarginate forefemur, a unique such combination. In *rotundus*, however, the clypeal lobe is broader (lip corners closer to the corresponding orbit than to each other), the lip corner is ill defined, the bevel is absent or reduced to a narrow strip adjacent to the lip base, the trimmal carina has a low, obtuse tooth (Fig. 321b), the hindfemoral venter has the inner (= posterior) margin obtuse, and the apical prong of sternum VIII is not incised. In *pentheri*, the clypeal lobe is narrower (corners in most specimens closer to each other than to the corresponding orbit), the lip corner is well defined, the bevel is about as long as the basomedian area, the trimmal carina has a well-defined tooth (Fig. 275b), and each of the apical prongs of sternum VIII, in most specimens,

is incised on inner margin (Fig. 275c). Also, the shape of the volsella is distinctive in *rotundus* (Fig. 321c).

Ridges of the propodeal side, in most females and males, are somewhat coarser than in the related species.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, with a few evanescent punctures, as long as 0.7 of scape. Scutal punctures minute, inconspicuous, averaging about one diameter apart. Mesopleuron dull, evenly, minutely punctate (punctures about one diameter apart). Propodeal dorsum evenly microareolate; side ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate.

Setae appressed on postocellar area, scutum, propodeal dorsum, and femora; nearly appressed and shorter than midocellar diameter on each side of oral fossa next to occipital carina; most setae on propodeal dorsum oriented laterad or posterolaterad, but diverging anterolaterad from midline.

Head and thorax black, but mandible mesally and labrum reddish, also clypeal bevel reddish in some males. Frontal setae silvery in both sexes. Wing membrane slightly infumate to nearly hyaline; forewing costal vein reddish brown, subcostal vein brown. Femora black except apically, tibiae and tarsi reddish. Gastral segments I and II or I–III red, remainder black. Terga I–IV in female, I–IV or I–V in male, silvery fasciate apically. Tarsal spines black or dark brown in female, including rake (proximal basitarsal spines light in some specimens).

♀.— Clypeus (Fig. 321a): bevel about as long mesally as basomedian area or shorter; lip slightly arcuate, insignificantly emarginate mesally in most specimens, shallowly, broadly sinuous laterally. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 2.5–2.7 × apical width. Dorsal foretibial surface with one or two spines; outer surface with one or two spines.

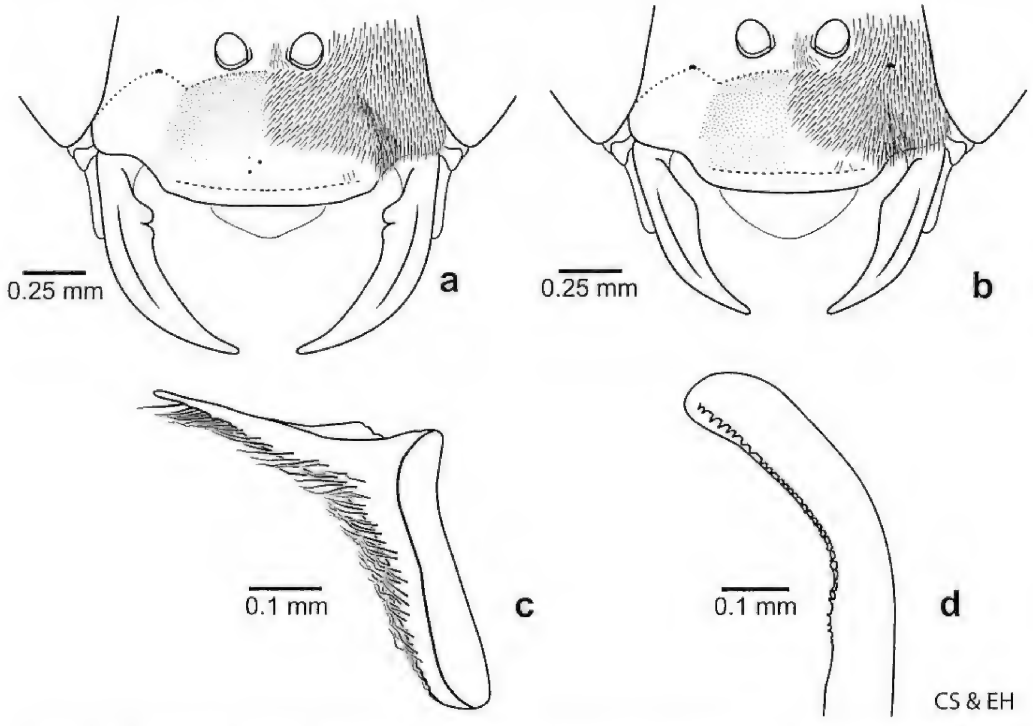


Figure 321. *Tachysphex rotundus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Forebasitarsus with seven or eight rake spines. Foretarsomeres I–III slightly expanded apicolaterally over bases of rake spines (Figs. 9c, e). Tergum V finely punctate, including apical depression. Pygidial plate microsculptured, dull, with fine, sparse punctures, at least basally. Length 9.0–9.8 mm.

♂.— Mandible: trimmal carina with low, obtuse tooth, without cleft. Clypeus (Fig. 321b): bevel absent or reduced to narrow strip adjacent to lip base; lip free margin slightly arcuate to nearly straight, with obtusely angulate, somewhat ill-defined corner; distance between corners about 1.5–1.6 × distance between corner and orbit. Width of postocellar area 1.2–1.5 × length. Dorsal length of flagellomere I 1.5–1.8 × apical width. Forefemoral notch absent. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna V and VI each with subbasal fringe of agglutinated setae (fringes visible only when gastral segments are fully extended). Sternum VIII deeply emarginate, almost as in *pentheri* (see Fig. 275c). Length 5.6–8.2 mm. Volsella and penis valve: Figs. 321c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 314).— Zaire, Angola, Namibia, Botswana, Zimbabwe, South Africa.

RECORDS.— HOLOTYPE: ♂, **NAMIBIA**: **Rehoboth District**: 23 km N Rehoboth, 17 Feb 1990, WJP (CAS). PARATYPES: **ANGOLA**: River Curoca 7 mi NE Porto Alexandre, 25–26 Feb 1972, [British Museum] Southern African Expedition (1 ♂, BMNH). **BOTSWANA**: Gugama, Dec 1979, V. Wilmot (1 ♀, PMA); Lake Ngami 12 mi NE Sehithwa, 16–17 Apr 1972, [British Museum] Southern African Expedition (1 ♀, BMNH); Moremi Reserve, 18–20 Apr 1972, [British Museum] Southern African Expedition (5 ♀, BMNH). **NAMIBIA**: **Gobabis District**: 8 mi W Gobabis, 11 Apr 1972, [British Museum] Southern African Expedition (1 ♀, BMNH). **Grootfontein District**: 40 km NE Grootfontein, 16 Jan 1993, MS (1 ♀); 90 km NE Grootfontein, 16 Jan 1993, MS (1 ♂, MS); Kombat, [British Museum] Southern African Expedition (1 ♀, BMNH). **Karasburg District**: Groenrivier 265 [Farm], SE 2718 Bd [= between 27°15′ and 27°30′S and 18°45′ and 19°00′E], 25 Apr 1972, collector unknown (1 ♀, NMN). **Mariental District**: 41 km SW Gibeon, 10 Mar 1999, FSG (1 ♂, AMG); Onze Rust 192 [Farm], 17–18 May 1973, C. Jacot-Guillarmod (2 ♂, AMG); Vaalbank 319 [Farm], 20–22 May 1973, C. Jacot-Guillarmod (1 ♀, 1 ♂; 3 ♀, 1 ♂, AMG). **Okahandja District**: 70 km N Okahandja, 16 Mar 1990, WJP (1 ♂). **Rehoboth District**: same data as holotype (1 ♂). **Rundu District**: Rundu, J. Gusenleitner, 20 Jan 1993 (1 ♀), 17 and 18 Jan 1993 (2 ♀, JG); 100 km SW Rundu, J. Gusenleitner, 25 Jan 1993 (1 ♀; 1 ♀, JG), 28 Jan 1993 (1 ♀); Takuasa, SE 1720 Cd [= between 17°45′ and 18°00′S and 20°15′ and 20°30′E], 14–19 Aug 1971, collector unknown (1 ♀, NMN). **Windhoek District**: Knamhoek Farm [a misspelling for Kromhoek?] at 2315Db [= between 23°30′ and 23°45′S and 15°45′ and 16°00′E], 15 Feb 1974, L. Lyneborg (1 ♀, 1 ♂, ZMUC), Solitaire at 23°52′S 16°00′E, 30 Apr 2002, FSG (1 ♀, AMG). **SOUTH AFRICA**: **Eastern Cape Province**: 9 km E Willowmore, 28 Jan 1996, WJP (1 ♂). **Northern Cape Province**: 25 km E Hondeklipbaai, 17 Oct 1999, M. Halada (1 ♂, OÖLM); Nossob in Kalahari Gemsbok National Park, 27 Mar 1990, MS (1 ♂, MS), WJP (1 ♂); 90 km ENE Springbok at 29°20.1′S 18°44.3′E, 10 Sept 2001, WJP (2 ♂). **North-West Province**: 135 km E Van Zylsrus, 26 Mar 1990, WJP (1 ♀). **Western Cape Province**: Cape Town: Milnerton, Jan 1926, R.E. Turner (1 ♂, BMNH); 60 km N Cape Town, 9 Nov 1999, M. Halada (2 ♀, 2 ♂; 3 ♀, 2 ♂, OÖLM); Ceres, Dec 1920, R.E. Turner (1 ♀, BMNH); Ceres: upper sources Olifants River, Dec 1949, [South African] Mus[eum] Exp[edition] (3 ♀, SAM); 20 km N Citrusdal, 27 Oct 1999, M. Halada (3 ♂, OÖLM); Pearly Beach, Dec 1958, S[outh] A[frican] M[useum Staff] (2 ♀, SAM); Wellington: Rooshoek, P.M.F. Verhoeff, 17–30 Nov 1973 (1 ♂; 1 ♂, RMNH) and Dec 1973 (1 ♀, RMNH); Witzenberg Valley in Ceres District, 21–23 Dec 1920, R.E. Turner (1 ♀, BMNH). **ZAIRE**: **Bas-Zaïre**: Mayidi at 5°11′S 15°09′E, 1942, P. van Eyen (1 ♀, MRAC). **ZIMBABWE**: 11 km NE Nyamandhlovu, WJP, 24 Feb 1995 (3 ♂) and 29 Dec 1995 (1 ♀); Sawmills, Roy Stevenson, 1 Apr 1923 (1 ♂, TMP) and 25 Feb 1924 (1 ♂, USNM); Victoria Falls, 19–23 June 1998, K.M. Guichard (1 ♀, KMG).

***Tachysphex ruber* Pulawski, sp. nov.**
Figures 320, 322.

DERIVATION OF NAME.— *Ruber*, Latin for red; an allusion to the predominantly red body of this species.

RECOGNITION.— *Tachysphex ruber* is one of several species in which a convex labrum (markedly protruding beyond the clypeal free margin) and elongate galea (about as long as the scape) are combined with a ridged propodeal side (ridges present only anteriorly in some specimens), oblong upper metapleural pit, setae straight on the head and thorax (appressed on postocellar area), and the propodeal dorsum all setose, with setae diverging anterolaterad from the midline. In the male, sterna IV–VI each has a subbasal fringe of short, agglutinated setae.

The female of *ruber* has slightly expanded apicolaterally foretarsomeres I–III (as in Fig. 9c), hence bases of apical rake spines originate from the ventral surface rather than the lateral margin, and the apex of the pygidial plate is curving ventrad (as in Fig. 80d). The expanded foretarsomeres are also found in females of *aethiopicus*, *melanius*, *miniatulus*, *rotundus*, and *usakos*, and the pygidial plate is curving apically in *camptopygus*, but the combination of the two features is unique to *ruber*. An all red gaster and dense mesopleural vestiture (fully concealing integument) are subsidiary recognition characters.

The male of *ruber* resembles *aethiopicus* and *usakos* in having a broad clypeal lobe, with corners further apart than each is from the orbit (Fig. 322b). Unlike these two species, the forefemoral notch of *ruber* is microscopically setose (rather than glabrous). Unlike *aethiopicus*, the clypeal bevel is unsculptured between punctures (rather than microsculptured) and, unlike *usakos*, each of sterna IV–VI has a subbasal, low fringe of agglutinated setae (fringes visible only when the gastral segments are fully extended). In most specimens, the free margin of the clypeal lobe is broadly, shallowly emarginate (slightly arcuate to straight in *aethiopicus* and *usakos*), and the gastral tip is red (only sternum VIII in some specimens), whereas black in the other two species.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, sparsely punctate, as long as 0.7–0.8 of scape. Scutal punctures somewhat ill defined, less than one diameter apart. Mesopleural punctures ill defined, less than one diameter apart except about one diameter apart posteriorly. Propodeal dorsum evenly microareolate; side ridged, but ridges evanescent except anteriorly in some males; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally or not carinate.

Setae appressed on postocellar area; about one midocellar diameter long on each side of oral fossa next to occipital carina; appressed on scutum (no longer than one midocellar diameter); fully concealing integument on female mesopleuron; on propodeal dorsum diverging anterolaterad from midline.

Head and thorax black except the following yellowish red: mandible (apex black), labrum, clypeal bevel and lip, scapal venter, and pronotal lobe. Frontal setae silvery in both sexes. Wings hyaline; forewing costal vein yellowish, subcostal vein brown. Femora, tibiae, and tarsi red. Gaster red in female, in male red basally, with segments IV–VI or III–VII somewhat darkened to black, and segment VII mostly red or reddish (only sternum VIII red in some specimens). Terga I–IV in female, I–V in male, silvery fasciate apically.

♀.— Clypeus (Fig. 322a): bevel slightly shorter to slightly longer than basomedian area; lip free margin nearly straight, neither emarginate mesally nor incised laterally. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 2.2–2.5 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with seven rake spines. Lateral margin of foretarsomeres I–III slightly expanded, apical rake spines originating from ventral surface.

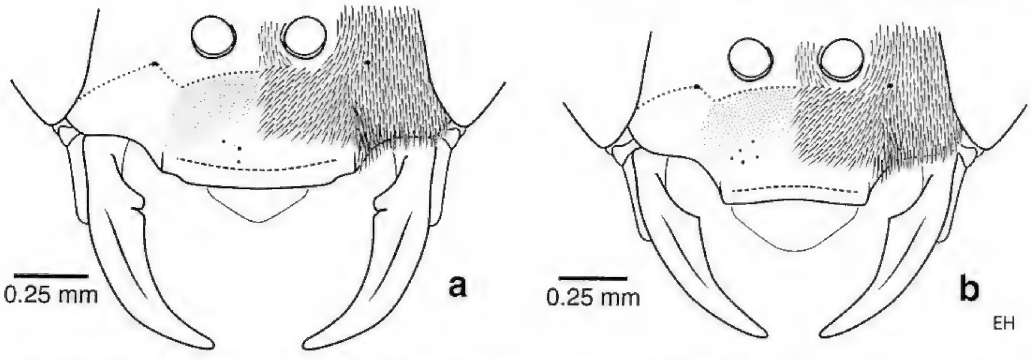


FIGURE 322. *Tachysphex ruber* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible.

Tergum V uniformly micropunctate, including apical depression. Pygidial plate with a few, sparse punctures, interspaces shiny, unsculptured or nearly so. Length 6.5–7.8 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 322b): bevel slightly shorter to slightly longer than basomedian area; lip free margin straight or minimally concave, with well-defined corner; distance between corners 1.2–1.3 × distance between corner and orbit. Width of postocellar area 1.2 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width. Forefemoral notch microsculptured, microsetose. Outer margin of forebasitarsus with three or four rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna IV–VI each with subbasal fringe of agglutinated setae that are visible only when segments are fully extended (setae shorter than in *pentheri*, see Figs. 276a-f). Sternum VIII shallowly emarginate apically. Length 5.7–6.6 mm. Volsella and penis valve as in *aethiopicus* (see Fig. 10).

GEOGRAPHIC DISTRIBUTION (Fig. 320).— Namibia, Botswana, northwestern South Africa.

RECORDS.— HOLOTYPE: ♀, **NAMIBIA**: **Rehoboth District**: 15 km N Kalkrand, 13 Feb 1990, WJP (CAS). PARATYPES: **BOTSWANA**: 1.5 km E Cheleka in Kalahari Gemsbok National Park, 27 Mar 1990, WJP (1 ♂). **NAMIBIA**: **Karibib District**: 15 km W Karibib, 26 Feb 1990, MS (1 ♀, MS), WJP (1 ♂); 17 km W Usakos, 21 Feb 1990, MS (1 ♂, MS), WJP (4 ♂); 65 km SW Usakos, 24 Feb 1990, MS (1 ♀; 1 ♂, MS). **Keetmanshoop District**: 2 km from road C17 on road 511 to Mata Mata, 8 Mar 2000, FSG (1 ♀, AMG). **Lüderitz District**: Klein-Aus Vista, 2 Mar 2000, FSG (1 ♀, AMG). **Maltahöhe District**: Aandster Farm at 2515Bd [= between 25°15′ and 25°30′S and 15°45′ and 16°00′E], 17 Feb 1974, L. Lyneborg (1 ♂, ZMUC). **Rehoboth District**: 15 km N Kalkrand, 13 Feb 1990, WJP (2 ♂); 9 km S Rehoboth, 14 Feb 1990, MS (1 ♀, MS); 49 km S Rehoboth, 9 Feb 1990, WJP (1 ♂). **SOUTH AFRICA**: **Northern Cape Province**: Nossob in Kalahari Gemsbok National Park, 27 Mar 1990, MS (1 ♂, MS); Nossob River bed 20 km S Nossob Rest Camp, 8 Mar 1990, FSG (1 ♀; 2 ♀, AMG).

Tachysphex rufopictus Arnold, new status

Figures 317, 323.

Tachysphex braunsi var. *rufopictus* Arnold, 1929:385, ♂. Holotype: ♂, South Africa: Eastern Cape Province: Lady Gray (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex braunsi rufopictus*: Bohart and Menke, 1976:272 (new status, listed).

Tachysphex brachycerus Arnold, 1940:121, ♀. Holotype: ♀, South Africa: Eastern Cape Province: Willowmore (TMP), examined. **New synonym.**— Bohart and Menke, 1976:272 (listed).

RECOGNITION.— *Tachysphex rufopictus* has the fore- and midfemora shiny, impunctate and glabrous posteroventrally (at least partly so) except for a few, sparse, setigerous punctures, the propodeal dorsum evenly microareolate, the propodeal side unridged (at least mesally), and the

gaster red basally and black apically. In addition, the labrum is practically flat, nonemarginate, the hindwing vein cu-a vertical, the setae are appressed on the postocellar area and scutum and slightly inclined posterad on the propodeal dorsum; in the female the length of tarsomeres II is twice the apical width and the apicoventral margin of tarsomeres V is arcuate; and the male foretarsus has no rake.

The female differs from other such species in having an unusually narrow clypeal lip (Fig. 323a), in combination with black femora and nonfasciate terga.

The male of *rufopictus* has a distinctive clypeus, with an elongate middle section and a roundly pointed lip with at most a rudimentary corner (Fig. 323b), the lip's free margin forming a single curved line with that of the lateral section. Also, the tibiae and tarsi are red. Unlike *braunsi*, *rufopictus* has the punctures of sterna IV–VI markedly larger and sparser than those of sternum II basally, and the gaster of most specimens is red basally (in *braunsi*, the gaster is all black and punctures of sterna IV–VI are only inconspicuously larger and sparser than those of sternum II). The male of *waltoni* has a similar clypeus, but the femora are finely punctured throughout, the setae are inclined obliquely anterad on the propodeal dorsum anteromesally, and somewhat erect (not fully appressed) on sterna III–VI.

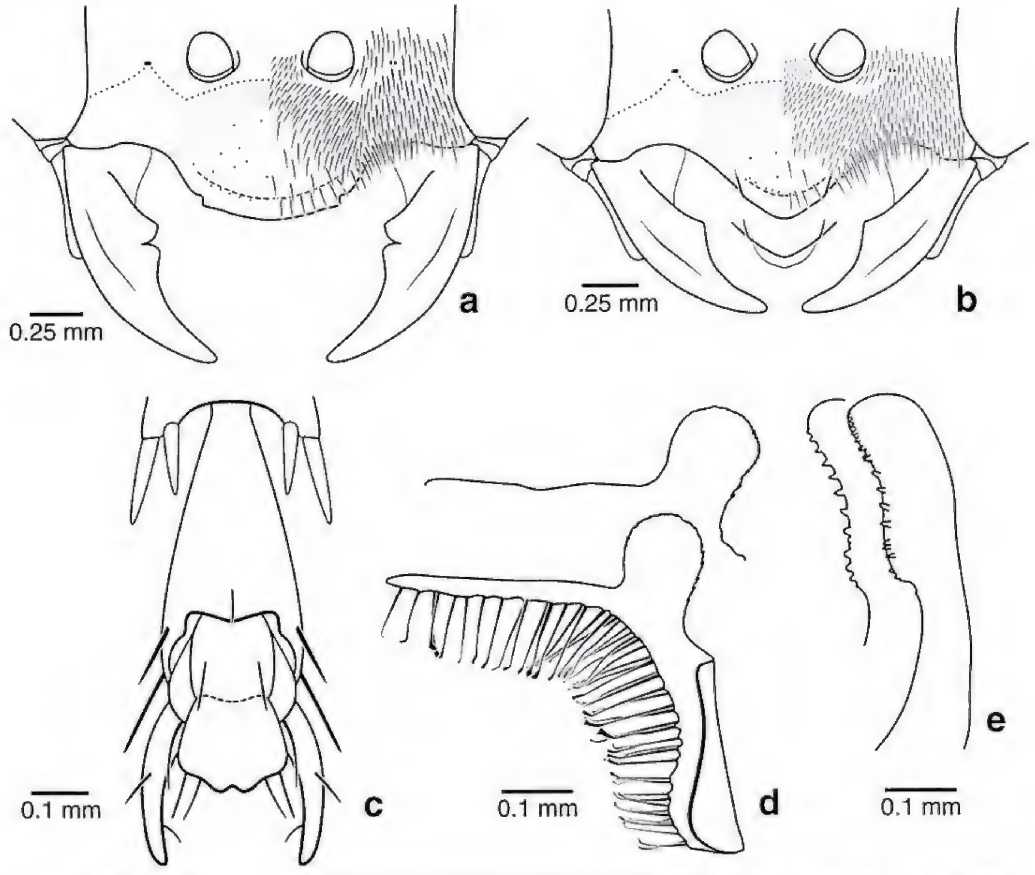


FIGURE 323. *Tachysphex rufopictus* Arnold: a – female clypeus and mandible (clypeal setae, partly missing in the model specimen, the holotype, have been reconstructed in this drawing); b – male clypeus and mandible with outline showing variation of clypeal free margin; c – venter of female hindtarsomere V; d – volsella with outline showing variation of dorsal process; e – penis valve with outline showing variation.

Justification of new synonymy.— The holotype female of *brachycerus* agrees with the males of *rufopictus* in the propodeal and femoral sculpture, setation, color of the gaster, and absence of tergal fasciae, a unique such combination. I conclude that they are opposite sexes of one species, and I regard the two names as synonyms.

Description.— Labrum minimally convex at very apex, obtusely pointed mesally (almost arcuate in one male), not or only slightly protruding from beneath clypeus. Galea longer than wide in profile, equal to about 0.9 of scape, with several large punctures. Female scutum with fine but well-defined punctures that average about two diameters apart on disk, and also with somewhat larger punctures that average many diameters apart (interspaces shiny); male scutum with uniform punctures that average slightly more than one diameter apart on disk (interspaces somewhat dull). Mesopleuron anterad of episternal sulcus and above scrobal sulcus dull, microsculptured, with minute punctures that are about one diameter apart; beneath scrobe with well-defined, medium-size punctures that are several diameters apart (interspaces microsculptured). Episternal sulcus mostly complete, but effaced anteroventrally in two males examined. Propodeal dorsum evenly microareolate; side finely punctate, varying from all unridged to ridged along anterior, dorsal, and posterior margins. Hindcoxal dorsum with inner margin carinate basally. Sternum I apically with longitudinal carina that bisects apical depression.

Setae suberect, about as long as midocellar diameter on each side of oral fossa next to occipital carina; appressed on postocellar area and scutum; inclined posterad on propodeal dorsum.

Head and thorax black, mandible dark red mesally. Frontal setae silvery in female, golden in male. Wing membrane yellowish; forewing costal vein light brown, subcostal vein dark brown. Femora black (apex red in male), tibiae and tarsi varying from all red to all black in female, all red in male. Gastral segments I and II mostly red (also segment III in some males), remainder black, but red reduced in single female from Steytlerville area, and gaster all black in some males. Terga without silvery, apical fasciae, or male terga I–III with rudimentary fasciae.

♀.— Clypeus (Fig. 323a): bevel markedly longer than basomedian area; lip reduced laterally, hence unusually narrow (distance between corners equal to 0.8 of distance between corner and orbit), its free margin arcuate. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere I 1.6 × apical width; flagellomeres III–X with somewhat ill-defined sensory areas; length of flagellomere VIII 1.5–1.6 × width. Midtrochanteral venter shiny, with a few, sparse punctures. Fore- and midfemoral venters and posteroventral surfaces aciculate, shiny, with a few large, sparse punctures. Dorsal foretibial surface with three thin setae or bristles; outer surface with three or four bristles, interspaces glabrous. Mid- and hindtibial dorsum asetose. Forebasitarsus with ten rake spines. Length of fore-, mid-, and hindtarsomeres II 1.4, 2.0, and 2.4 × apical width, respectively, slightly less than average for the genus. Apicoventral margin of hindtarsomere V arcuate (Fig. 323c). Apical depression of tergum V unsculptured, glabrous. Pygidial plate with a few, sparse punctures, interspaces unsculptured; apex roundly truncate (not emarginate). Length 9.2–10.0 mm.

♂.— Mandible: trimmal carina with conspicuous, obtuse tooth, without cleft. Clypeus (Fig. 323b): bevel ill defined, about as long as basomedian area; lip free margin obtusely pointed mesally, without corner or with rudimentary corner, forming single curved line with rest of clypeal margin. Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 1.4–1.6 × apical width. Forefemoral notch microscopically setose. Posteroventral surface of fore- and midfemora aciculate, impunctate and glabrous, except for a few large, sparse punctures. Outer margin of forebasitarsus with varying number of rake spines: either without preapical spines, or with one or two such spines in apical quarter or third, or with three preapical spines located at about one third and two quarters of the basitarsus length, respectively, and one next to apex; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with one small spine that may

be missing on some legs. Punctures markedly larger and sparser on sterna IV–VI than on sternum II basally. Sterna II and III, in male from Doringbos, with erect setae that are about as long as midocellar diameter; sterna IV–VI, in the male from Ouberg Pass, with some suberect setae (in addition to usual longer setae that border apical depression). Sternum VIII: mesal portion of apical margin varying from evenly concave to tridentate. Length 7.8–9.8 mm. Volsella and penis valve: Figs. 323d, e.

FLORAL RECORDS.— The male from Clifton Farm was collected "on minute flowers of *Bergia glomerata* L. f. (Elatinaceae)", as recorded by the collectors, F.W. and S.K. Gess.

COLLECTING PERIOD.— 20 November through 20 January.

GEOGRAPHIC DISTRIBUTION (Fig. 317).— Central-southern South Africa.

RECORDS.— **SOUTH AFRICA**: **Eastern Cape Province**: Clifton Farm 18 km NW Grahamstown (1 ♂, AMG), Elandsheuwels Farm 40 km W Steytlerville (2 ♂, USU), Goodehoop Farm 16 km W Steytlerville (1 ♂; 1 ♂, USU), 17 mi NW Grahamstown (1 ♂, AMNH), 18 km WNW Grahamstown: Hilton Farm (1 ♀, 2 ♂; 4 ♂, AMG), Lady Grey (3 ♂, SAM, including holotype of *rufopictus*), 3 km N Steytlerville (1 ♀, USU), 28 km S Steytlerville: Wolwekraal Farm (1 ♂; 2 ♂, USU), Strowan Farm 5 air km W Grahamstown (1 ♀; 1 ♀, AMG), Table Farm 10 km NW Grahamstown (1 ♀, AMG), Willowmore (1 ♂, AMG; 1 ♀, TMP, holotype of *brachycerus*), 9 km E Willowmore (1 ♂). **Western Cape Province**: Doringbos at 31°58′19″S 19°13′33″E (1 ♂, CSE), Langberg (1 ♂; 1 ♂, OÖLM), Ouberg Pass 27 road km NE Montagu at 33°40′S 20°16′E (1 ♂).

Tachysphex rugosipleuris Pulawski, sp. nov.

Figures 320, 324.

DERIVATION OF NAME.— *Rugosipleuris*, a Neolatin adjective derived from the Latin word *rugosus*, wrinkled, and the Greek word *pleuron*, a rib; with reference to the rugose mesopleuron of this species.

RECOGNITION.— The female of *rugosipleuris* has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate (almost straight), apicoventral margins of tarsomeres III and IV mesally projecting or at least convex, tarsomeres V angulate basoventrally, each with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe, and on each leg one claw smaller than the other. Unlike other such species, the mesopleuron of *rugosipleuris* is rugose rather than punctate.

The male can be recognized by the following combination: gaster black; mesopleuron rugose; middle clypeal section flat, without bevel (Fig. 324b); lip corners well defined, closer to adjacent orbit that to each other; setae all straight, on postocellar area erect, about as long as midocellar diameter; hindcoxal dorsum carinate basally, carina not expanded; apical tarsomeres with a preapical cluster of small spines on venter, and hindtarsomere V somewhat expanded laterally (expansion best seen in the dorsolateral view).

DESCRIPTION.— Scutal punctures well defined, about one diameter apart in most females (a few discal puncture up to two diameters apart in some), in males many discal punctures up to two or three diameters apart. Mesopleuron rugose. Propodeal dorsum rugose, but only slightly so (and partly microsculptured) in one male; side ridged, but ridges largely evanescent in the same male. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, about as long as midocellar diameter; suberect, about as long as midocellar diameter on each side of oral fossa next to occipital carina; suberect, shorter than midocellar diameter on scutum; oriented posterad on propodeal dorsum.

Head and thorax black, mandible reddish subapically. Frontal setae silvery in female, silvery with golden tinge beneath midocellus in male. Wing membrane slightly infumate; costal vein of

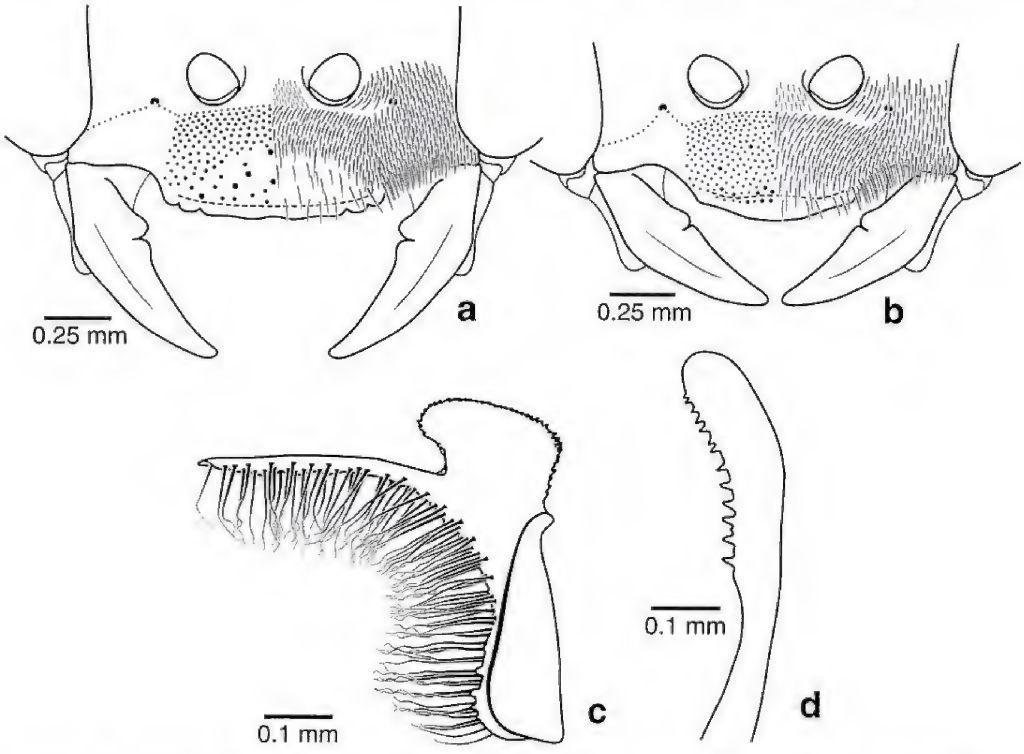


FIGURE 324. *Tachysphex rugosipleuris* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

forewing light brown, subcostal vein dark brown. Femora, gaster, and female tibiae black; male tibiae black except the following reddish: foretibial inner surface, hindtibial inner surface in many specimens, and midtibial venter and apex in some. Terga I–III silvery fasciate apically.

♀.— Labrum emarginate. Clypeus (Fig. 324a): bevel somewhat ill defined, longer mesally to shorter than basomedian area; lip free margin arcuate, shallowly emarginate mesally, with two lateral incisions on each side. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.8 × apical width. Scutum and scutellum slightly flattened. Forefemoral posteroventral surface microsculptured, with punctures that are many diameters apart. Dorsal foretibial surface with no spines or bristles; outer surface with punctures and setae sparser than remaining surface, with 1–3 long, suberect setae but no spines. Forebasitarsus with 7–9 rake spines (spines unusually short in females from Cameroon, no longer than basitarsus width). Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical margin very broadly emarginate (almost straight), apicoventral margin obtusely prominent. Outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; lateral margin with row of small spines subbasally; apicoventral margin produced into lobe. Outer claw in each pair shorter and thinner than inner claw (opposite on foretarsus). Apical depression of tergum V unsculptured, glabrous. Pygidial plate with well-defined punctures, mostly several diameters apart (some punctures less than one diameter apart); interspaces aciculate. Length 7.8–8.1 mm.

♂.— Mandible: trimmal carina obtusely angulate, without real tooth, with small cleft. Clypeus (Fig. 324b): bevel absent; lip free margin slightly sinuate, with well-defined corner; distance

between corners 1.3–1.4 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.4–1.6 × apical width. Forefemoral notch with bottom densely, microscopically setose. Outer margin of forebasitarsus without preapical spines. Outer apical spine of foretarsomere II markedly shorter than tarsomere III. Venters of tarsomeres V each with preapical group of small spines; lateral margin of hindtarsomere V somewhat expanded (expansion best seen in dorsolateral view). Length 5.2–7.7 mm. Volsella and penis valve: Figs. 324c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 320).— Senegal to Cameroon.

RECORDS.— HOLOTYPE: ♂, **SENEGAL**: 10 km S Bignona, 12 July 1991, WJP (CAS). PARATYPES: **BURKINA FASO**: Kompienga 20 km S Pama, 3–24 Sept 1988, Sanborne, Génier, and Tou (1 ♀; 1 ♀, LEM). **CAMEROON**: 15 km W Campement des Eléphants and 67 km S Garoua, 13–19 July 2003, WJP (2 ♀, 1 ♂). **IVORY COAST**: Bouaké: Foro-Foro, 10–12 May 1971, D. Duviard (1 ♀, UCD). **SENEGAL**: same data as holotype (7 ♂), Ziguinchor, 12 July 1991, AM (1 ♂, MSNT).

***Tachysphex sabulosus* Pulawski, sp. nov.**

Figures 325, 326.

DERIVATION OF NAME.— *Sabulosus*, Latin for sandy; with reference to the sandy habitats where the specimens were collected.

RECOGNITION.— *Tachysphex sabulosus* has the labrum convex and protruding beyond the clypeus free margin, the galea longer than wide in profile (length equal to the scape), and the propodeal dorsum glabrous mesally in the apical half. In addition, the gaster is bicolored (red basally, black apically), the terga are not fasciate apically, the tibiae are red, and the wing membrane is slightly infumate, almost hyaline.

The female differs from similar species in having an evenly arcuate clypeal free margin (Fig. 325a), without median emargination or lateral incision and with a nonprominent corner, and terga IV and V with fine but well-defined punctures.

The male can be recognized, in addition to the above features, by the presence of a well-defined corner of the clypeal lip (Fig. 325b), scutum shiny, with well-defined punctures, many of which are more than one diameter apart, presence of six spines on the forebasitarsus outer margin, and of conspicuous, subappressed setae on sterna III–VI.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea microsculptured, dull, with a few, scattered punctures, as long as scape in female, as 1.1 of scape in male. Scutal punctures well defined, interspaces shiny; many punctures on disk more than one diameter apart. Mesopleural punctures shallow, ill defined; interspaces dull. Propodeal dorsum irregularly ridged longitudinally in female, microscopically rugose in male; side ridged (finely so in male). Hindcoxal dorsum carinate basally.

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina but shorter than midocellar diameter; oriented posterad on propodeal dorsum except for glabrous apicomedian area that extends anterad to at least dorsum's midlength.

Head and thorax black, mandible reddish except black apex. Frontal setae in female silvery adjacent to antennae, with golden tinge in upper part, golden in male. Wing membrane slightly infumate to almost hyaline; costal vein of forewing yellowish, subcostal vein light brown. Femora black basally and red apically in female (about one quarter red on forefemoral posterior surface, about one third red on midfemoral posterior surface, hindfemur black only basally), largely red in male (fore- and midfemoral dorsum red in basal half or more); tibiae and tarsi red. Gastral segments I and II red (also base of tergum III in male), remainder black. Terga without silvery, apical fasciae.

♀.— Clypeus (Fig. 325a): bevel about as long as basomedian area; lip free margin evenly arcuate, not emarginate mesally nor sinuous or incised laterally. Width of postocellar area 0.5–0.6 ×

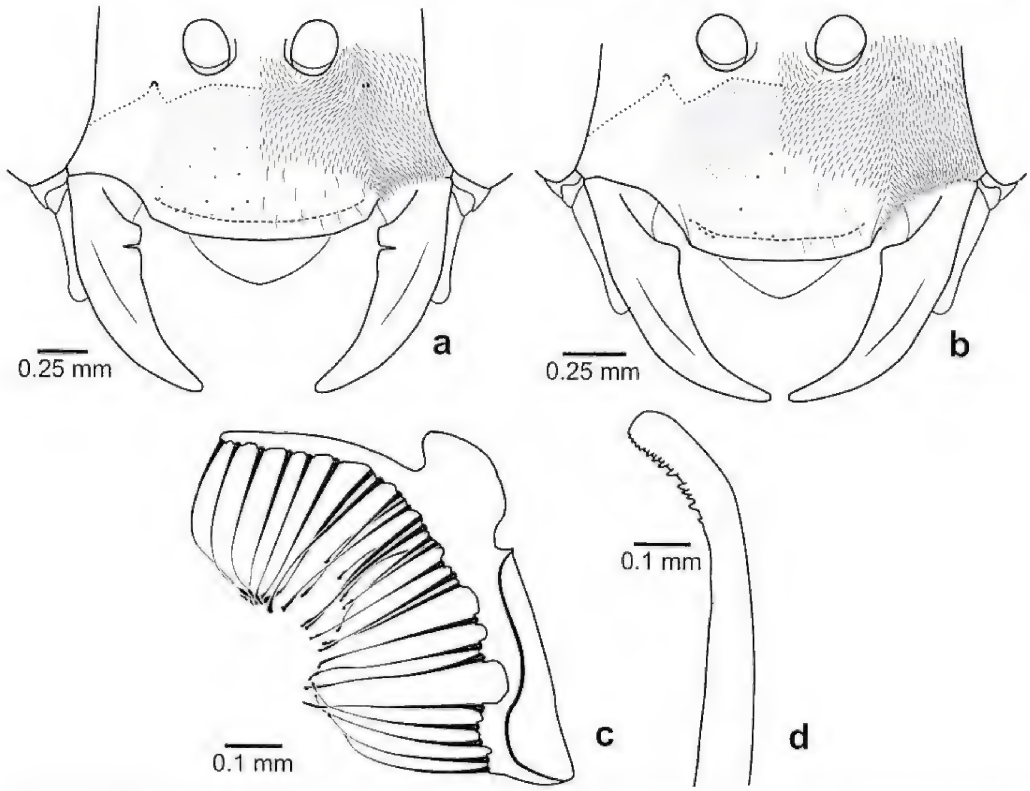


FIGURE 325. *Tachysphex sabulosus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

length. Dorsal length of flagellomere I 2.3–2.5 × apical width. Dorsal foretibial surface with two spines; outer surface with one or two spines. Forebasitarsus with six rake spines. Apical spines of hindtarsomere IV reaching claw base in female from Zimbabwe. Apical depression of tergum V punctate and setose throughout. Pygidial plate with punctures that average many diameters apart mesally, but about one diameter apart near margin; interspaces unsculptured. Length 10.2 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 325b): bevel about as long as basomedian area, delimited anterolaterally by oblique carina that emerges from each lip corner; lip free margin evenly arcuate, with well-defined corner; distance between corners 1.3 × distance between corner and orbit. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 1.7 × apical width, equal to 0.7 of

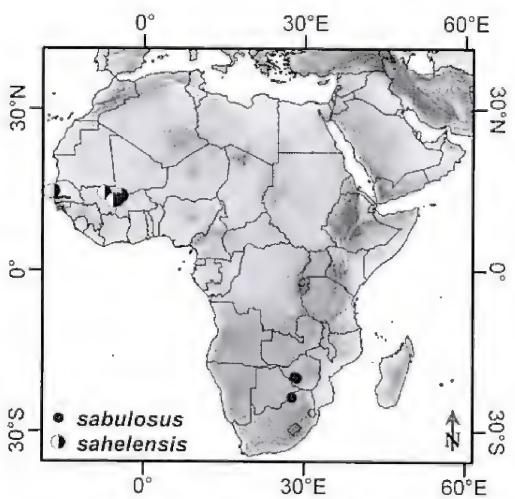


FIGURE 326. Collecting localities of *Tachysphex sabulosus* and *sahelensis*.

II. Forefemoral notch dull, asetose. Outer margin of forebasitarsus with six rake spines. Outer apical spine of foretarsomere II longer than tarsomere III. Setae of sterna III–VI abundant, subappressed. Sternum VIII shallowly emarginate apically, hindmargin almost straight between lateral prongs. Length 8.8 mm. Volsella and penis valve: Figs. 325c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 326).— Northeastern South Africa, Zimbabwe.

RECORDS.— HOLOTYPE: ♀, **ZIMBABWE**: Bulawayo airport at 20°00′S 28°38′E, 3 April 1998, WJP (CAS). PARATYPES: **SOUTH AFRICA**: **Northern Province**: Ellisras, 25 Mar 1978, H. Empey (1 ♀, AMG). **ZIMBABWE**: 11 km NE Nyamandhlovu, 24 Feb 1995, WJP (1 ♂).

Tachysphex saevus Arnold

Figures 327, 328.

Tachysphex saevus Arnold, 1924:52, ♀. Holotype: ♀, South Africa: Northern Province: Pietersburg (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:276 (listed).

RECOGNITION.— The female of *saevus* has an all black gaster, red legs, and unusually short tarsi (e.g., length of foretarsomere II and of midtarsomere III about equal to apical width). Other species are similar, but *saevus* differs by the combination of: labrum obtusely pointed mesally (Fig. 327a); mesopleuron dull, markedly microsculptured, with punctures that are more than one diameter apart below the scrobe; ventral midfemoral margin evenly convex except contrastingly concave preapically (Fig. 327c); and the pygidial plate with large and small punctures, the latter averaging about one diameter apart along the midline (Fig. 327d).

The male of *saevus* has the forefemoral posteroventral surface sparsely punctate distad of notch (punctures minute, several to many diameters apart). It can be distinguished from similar species by the following combination: gaster black, legs red (or forefemur black basally), midtarsomere IV about as long as apically wide, labrum flat, and setae of the propodeal dorsum all slightly inclined posterad. Subsidiary distinctive characters are: clypeus obtusely pointed (Fig. 327b), apical spine of foretarsomere II markedly shorter than foretarsomere III, propodeal side not ridged, all sterna evenly setose, and wings yellow (brownish along apical margin). Some males of *gessianus* (those with red legs) are nearly identical externally, but differ in having denser forefemoral punctures (at most a few diameters apart) and infumate wings. The shape of the penis valve helps in recognition: the dentate, apical part is angulate basally in *gessianus* (Fig. 165d) but not in *saevus* (Fig. 327f).

DESCRIPTION.— Galea in profile about as long as wide. Scutal punctures fine, well defined, averaging 1–2 diameters apart on disk. Mesopleural punctures shallow, ill defined, more than one diameter apart at center; interspaces microsculptured, dull. Propodeal dorsum rugose, side evenly microsculptured or finely punctate. Hindwing: anal end of crossvein cu-a slightly further away from wing base than cubital end. Hindcoxal dorsum carinate basally. Sternum I carinate longitudinally, without apical depression.

Setae suberect but no longer than midocellar diameter on postocellar area, nearly appressed on scutum; erect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; erect on episcrobal area; oriented posterad on propodeal dorsum.

Head, thorax, and gaster black, mandible reddish except basally and apically. Frontal setae silvery in female, pale golden in male. Wing membrane yellow, turning brownish in apical third or so; costal and subcostal veins of forewing reddish brown. Femora, tibiae, and tarsi red or male forefemur black basally. Female terga not fasciate or terga I–III with ill-defined fasciae, male terga I–III silvery fasciate apically (fasciae interrupted mesally).

♀.— Labrum obtusely pointed mesally (Fig. 327a). Clypeus (Fig. 327a): bevel shorter than basomedian area; lip free margin slightly concave on each side of midpoint, which is prominent,

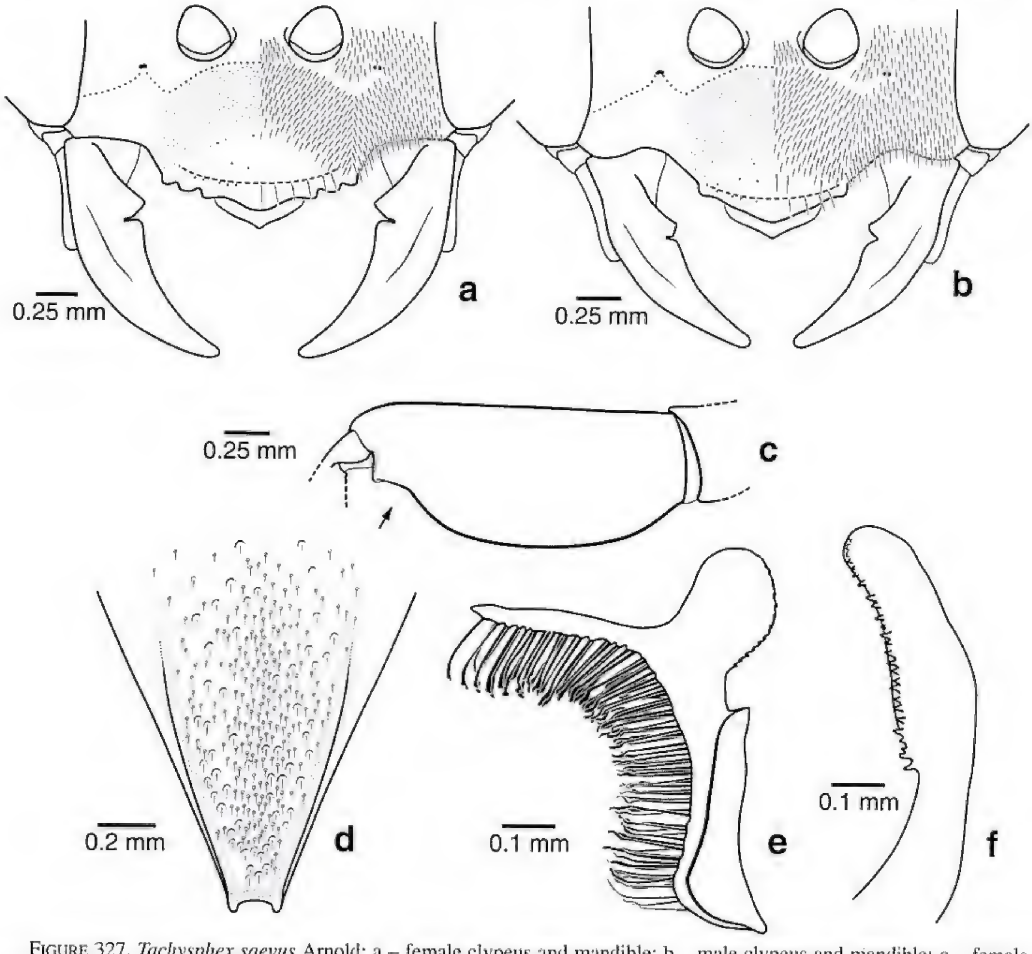


FIGURE 327. *Tachysphex saevus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – female midfemur; d – pygidial plate of female; e – volsella; f – penis valve.

and with two lateral incisions on each side. Width of postocellar area 1.3 × length. Dorsal length of flagellomere I 1.6 × apical width. Forefemoral posteroventral surface (except in basal third) with impunctate area that is widest near femur's apex. Foretibial outer surface with at least two spines, integument asetose. Ventral midfemoral margin evenly convex except contrastingly concave preapically (Fig. 327c). Tarsi short: length of fore- and midtarsomeres II 1.0–1.1 and 1.5–1.6 × apical width, respectively; that of midtarsomere III about 1.0 × apical width; length of fore-, mid-, and hindtarsomeres IV about 0.9, 0.9, and 1.1 × apical width, respectively. Forebasitarsus with eight or nine rake spines. Apical depression of tergum V asetose apicomesally. Pygidial plate emarginate apically, with large punctures that may concentrate laterally and average more than one diameter apart, and also with small punctures (at least mesally) that are about one diameter apart (Fig. 327d). Length 9.4–11.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 327b): bevel shorter than basomedian area; lip free margin obtusely pointed, with well-defined corner; distance between corners 1.1 × distance between corner and orbit. Width of postocellar area 1.3–1.5 × length. Dorsal length of flagellomere I 1.3–1.4 × apical width, ventral length equal to or slightly more than apical

width. Forefemoral posteroventral surface sparsely punctate distad of notch (punctures minute, several to many diameters apart), notch microscopically setose. Outer margin of forebasitarsus with 0–3 preapical rake spines (one may be next to apical spine, the other two far from apex); outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomere II about 2.0 × apical width, that of midtarsomere III × 1.2 apical width, and that of midtarsomere IV about equal to apical width. Apical margin of sternum VIII tridentate, but middle tooth evanescent in some specimens. Length 7.8–10.3 mm. Volsella and penis valve: Figs. 327e, f.

COLLECTING PERIOD.— 16 September through 1 November.

GEOGRAPHIC DISTRIBUTION (Fig. 328).— Northeastern South Africa and Zimbabwe.

RECORDS.— SOUTH AFRICA: Gauteng: Bronkhorstbaai ca 8–9 km S Bronkhorstspruit (1 ♀, AMG). **Northern Province**: Mogoto Nature Reserve near Zebediela (1 ♂, PPRI), Pietersburg (1 ♀, SAM, holotype of *saevus*). **ZIMBABWE**: Chimanimani (1 ♂, SAM, as Melsetter), Moodies Nek (2 ♂, SAM), Tandai (1 ♂, SAM), Victoria Falls (1 ♀, SAM), Vumba Mts. (1 ♀, 1 ♂, SAM).

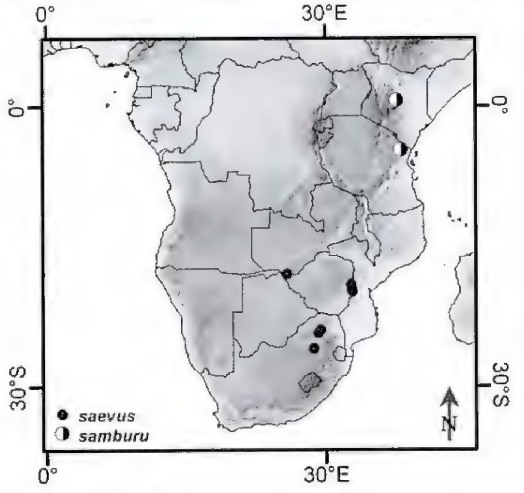


FIGURE 328. Collecting localities of *Tachysphex saevus* and *samburu*.

***Tachysphex sahelensis* Pulawski, sp. nov.**
Figures 326, 329.

DERIVATION OF NAME.— *Sahelensis*, a Neolatin masculine adjective derived from *Sahel*, the semidesert southern fringe of Sahara stretching from Senegal and Mauritania to Chad.

RECOGNITION.— *Tachysphex sahelensis* is characterized by a convex labrum, protruding beyond the clypeal free margin (although less so than in *panzeri* or *pentheri*), the galea longer than wide in profile, and terga I–IV silvery fasciate apically. In the male (the female is unknown), the foretarsal rake is absent (no preapical spines on the outer margin of the forebasitarsus), and the outer apical spine of foretarsomere II is shorter than this tarsomere's width; in addition, the dorsal volsellar process is rounded apically (Fig. 329c). Several species are similar, but *sahelensis* has the flagellum thicker mesally than basally or apically, short flagellomere I (dorsal length 1.1–1.4 × apical width rather than 1.9 × or more), clypeal lobe wide (distance between corners greater than clypeal midlength rather than equal to or smaller), and the tooth of the trimmal carina asymmetrical (rather than symmetrical), the outer side forming a right to obtuse angle with the remaining part of the carina (Fig. 329a). Finally, the micropunctures of flagellomeres IV–X are contrastingly more regular dorsally than ventrally.

SIMILAR UNASSIGNED SPECIMEN.— A male collected 70 km SE Ségou, Mali (CAS) resembles *sahelensis* in lacking the foretarsal rake and in having silvery fasciate terga I–III and an apically rounded dorsal volsellar process. It differs in having a symmetrical tooth on the inner mandibular margin, red gastral segments I and II, semicircular apical emargination of sternum VIII, and setae of the propodeal dorsum pointing mostly posterad.

DESCRIPTION (male only).— Labrum convex, protruding from beneath clypeus, although less so than in *panzeri* or *pentheri*. Galea longer that wide in profile, minutely, closely punctate, about

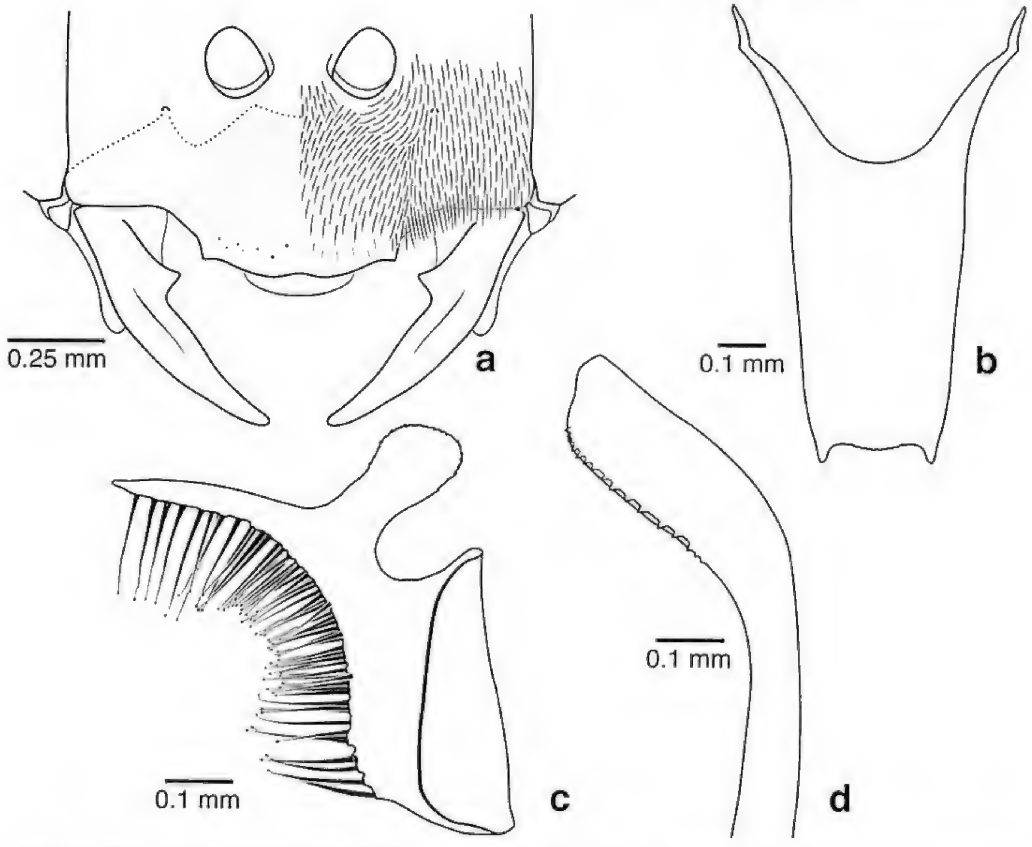


FIGURE 329. *Tachysphex sahelensis* Pulawski, sp. nov., male: a – clypeus and mandible; b – sternum VIII; c – volsella; d – penis valve.

as long as 1.3 of scape. Scutal punctures shallow, minute, about one diameter apart. Mesopleuron uniformly, microscopically areolate. Propodeal dorsum evenly microareolate, side evenly microsculptured except in most specimens finely ridged along dorsal margin.

Setae appressed on postocellar area and scutum; subappressed on each side of oral fossa next to occipital carina, no longer than one midocellar diameter; most setae of propodeal dorsum oriented anterad, but lateral setae oriented posterad an joining apicomesally.

Head, thorax, femora (except at very apex), and gaster black, mandible reddish at about two thirds of length. Frontal setae silvery. Wing membrane yellowish (insignificantly so in smallest specimens); costal vein of forewing light brown, subcostal vein brown. Tibiae reddish, partly dark; tarsi dark. Terga I–IV silvery fasciate apically.

♀.— Unknown.

♂.— Mandible (Fig. 329a): trimmal carina with tooth and cleft, distal side of tooth forming right to obtuse angle with remaining carina (which in most specimens is reduced, obtuse except sharp preapically). Clypeus (Fig. 329a): bevel shorter than basomedian area, delimited laterally by short, oblique, obtuse carina that emerges from lip corner; lip free margin arcuate, shallowly emarginate mesally in some specimens, with obtuse corner; distance between corners 1.5–1.6 × distance between corner and orbit. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere

I 1.1–1.4 × apical width. Flagellum thicker mesally than either basally or apically, flagellomeres IV–X with micropunctures more regular and microsetae sparser dorsally than ventrally (the two types of sculpture sharply separated from each other). Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III and than width of tarsomere II. Sternum VIII shallowly emarginate, its apical margin almost straight between lateral prongs (Fig. 329b). Length 6.0–9.1 mm. Volsella and penis valve: Figs. 329c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 326).— Mali, Senegal.

RECORDS.— HOLOTYPE: 1 ♂, **SENEGAL**: 4 km SW Thiès, 8 July 1991, WJP (CAS). PARATYPES: **SENEGAL**: Dakar, 21 Sept 1986, F. B[orgato] (1 ♀, FB); same data as holotype (10 ♂); same but 8 and 18 July 1991, AM (2 ♂, MSNT). **MALI**: Mourdiah, 13–25 Aug 1986, M. Matthews (3 ♂, BMNH); 20 km SW San, 22 Aug 1991, WJP (1 ♂); 100 km NE San, 21 Aug 1991, MS (1 ♂; 1 ♂, MS); 70 km SE Ségou, 2 Aug 1991, WJP (1 ♂).

***Tachysphex samburu* Pulawski, sp. nov.**
Figures 328, 330, 331.

DERIVATION OF NAME.— *Samburu*, one of the ethnic groups of Kenya, in whose territory this species was first collected.

RECOGNITION.— *Tachysphex samburu* is one of many species in which the labrum is flat, not emarginate, the mesothoracic punctures are well defined and the interspaces shiny, the setae are erect on the postocellar area, oriented obliquely anterad on the propodeal dorsum, and suberect on the midfemoral venter, and the tarsi are unspecialized (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins). Both sexes differ from similar species (except some *speciosissimus*, a northern hemisphere species) in having a rosette-like pattern on the scutum: the setae are oriented posterad along the midline in the anterior one third to two thirds, whereas the adjacent setae are oriented laterad (Figs. 330c, d). In addition, the gaster is red or reddish (only basally so in the male), with well-defined silvery, apical fasciae on terga I–V (I–VI in the male). Unlike *speciosissimus* (in which the mesopleuron is dull, finely rugose), the mesopleuron of *samburu* has well-defined punctures and shiny interspaces.

The male of *samburu* has a unique antenna, with flagellomere III longer than both flagellomeres II and IV, and flagellomere I unusually short, with the ventral length slightly smaller than apical width (Fig. 330e).

DESCRIPTION.— Mesothoracic punctures well defined, interspaces unsculptured, shiny; most scutal punctures several to many diameters apart; mesopleural punctures averaging about 2–3 diameters apart; punctures of mesothoracic venter, in male, several to many diameters apart (except close to each other along midline). Propodeal dorsum rugose; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, about one midocellar diameter long; on each side of oral fossa next to occipital carina erect, up to almost two midocellar diameters long; on scutum nearly appressed except suberect anterolaterally, oriented posterad along midline in anterior third to about two thirds, with adjacent setae oriented laterad, thus forming a characteristic, rosette-like pattern (Figs. 330c, d); suberect on midfemoral venter, about one midocellar diameter long; oriented obliquely anterad on propodeal dorsum.

Head and thorax black, mandible reddish except basally and apically. Frontal setae silvery in both sexes. Wing membrane slightly infumate; costal vein of forewing yellowish brown, subcostal vein dark brown. Leg coloration: see below. Gaster all red in female, in male segments I and II or

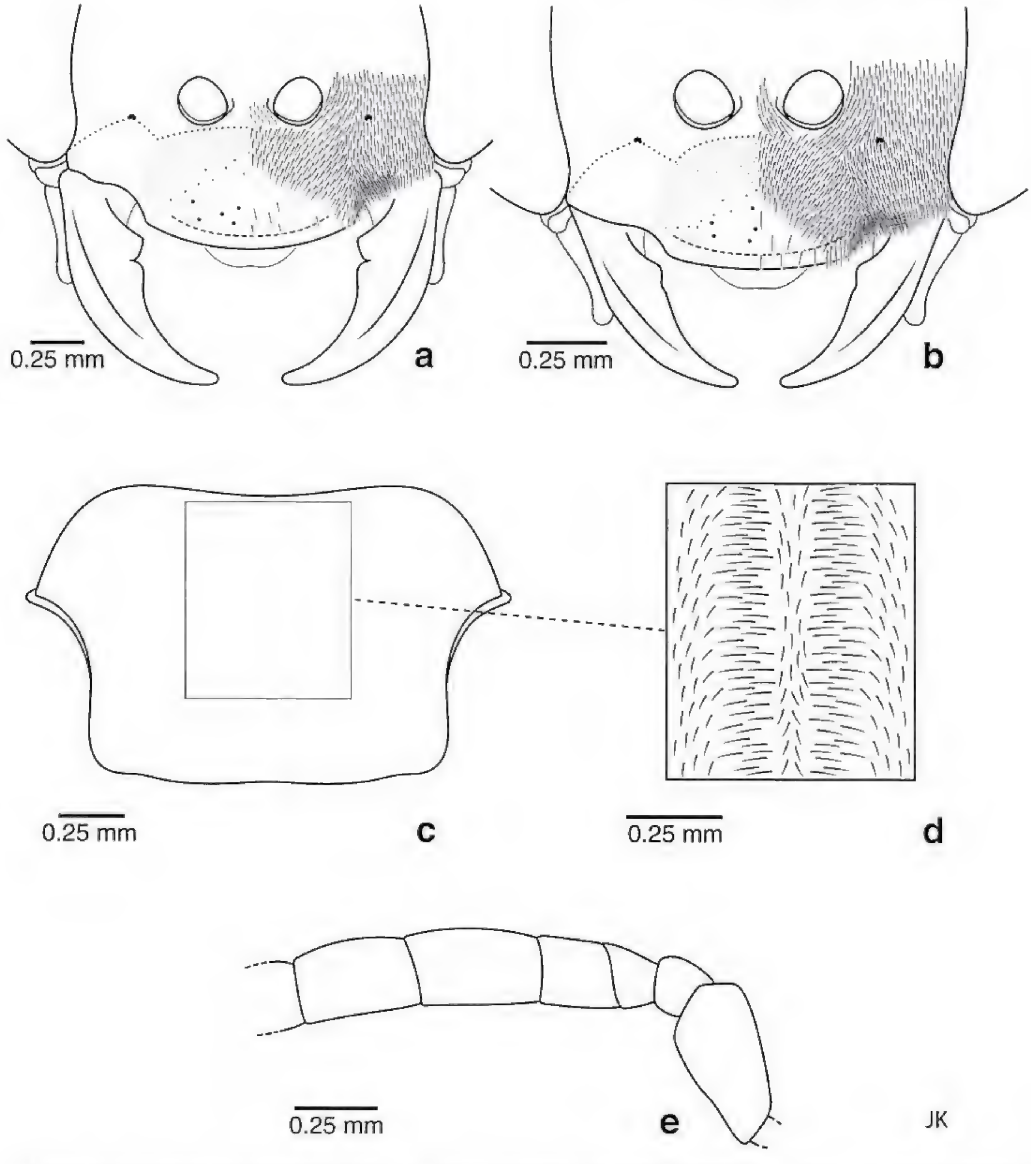


FIGURE 330. *Tachysphex samburu* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – female scutum; d – portion of scutum showing setal pattern; e – antennal base of male.

I–III red, remainder black. Terga I–V in female, I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 330a): bevel longer than basomedian area; lip free margin evenly arcuate. Width of postocellar area 1.9–2.0 × length. Dorsal length of flagellomere I 2.3–2.6 × apical width; middle flagellomeres unusually long, e.g., dorsal length of III 3.5–3.7 × apical width. Dorsal foretibial surface with either one or two minute spines or without spines or bristles; outer surface with two spines. Forebasitarsus with seven or eight rake spines. Venter of apical tarsomeres with one subbasal and one subapical spine. Apical depression of tergum V setose anteriorly, asetose near api-

cal margin. Pygidial plate with well-defined punctures that average many diameters apart (many lateral punctures less than one diameter apart in some specimens); interspaces microsculptured. Length 8.5–11.5 mm. Femora black or mid- and hindfemora partly reddish; tibiae black except reddish basally to partly reddish; tarsi black with apex reddish.

♂.— Mandible: trimmal carina with tooth, without cleft (Fig. 330b). Clypeus (Fig. 330b): bevel longer than basomedian area; lip free margin arcuate, with obtuse corner; distance between corners 1.5–1.8 × distance between corner and orbit. Width of postocellar area 2.3–2.6 × length. Ventral length of flagellomere I smaller than apical width, dorsal length 1.0–1.1 × apical width and equal to 0.8 of II; dorsal length of flagellomere III 1.9–2.0 × that of II and 1.2–1.3 × that of IV (Fig. 330e). Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 1–4 rake spines (i.e., without preapical spines in some specimens); outer apical spine of foretarsomere II slightly shorter to longer than tarsomere III. Sternal punctures well defined. Length 5.9–8.5 mm. Volsella and penis valve: Figs. 331. Forefemur mainly black (apex red), but apical half red in some specimens; mid- and hindfemora varying from black to red; tibiae red in most specimens, but largely black in some; tarsi red.

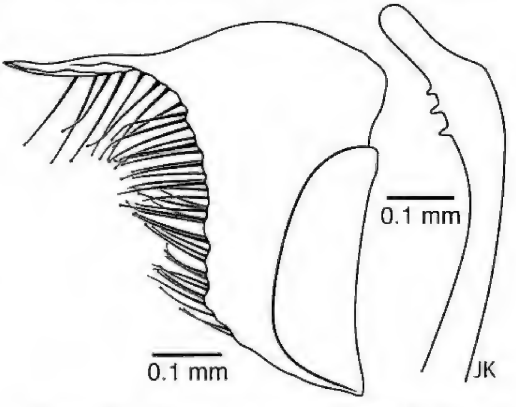


FIGURE 331. *Tachysphex samburu* Pulawski, sp. nov.: volsella and penis valve.

GEOGRAPHIC DISTRIBUTION (Fig. 328).— Kenya, Tanzania.

RECORDS.— HOLOTYPE: ♀, **KENYA**: **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post at 0°38.1′N 37°40.4′E, 19–20 Dec 2002, WJP (CAS). PARATYPES: **KENYA**: **Eastern Province**: same locality as holotype, 2–8 Dec 2002, M.A. Prentice (2 ♀, 25 ♂), WJP (2 ♀), 19–20 Dec 2002, M.A. Prentice (5 ♀, 35 ♂). **TANZANIA**: **Tanga Region**: 2 km NE Mkomazi, M.A. Prentice, 29–31 Dec 2002 (1 ♀), 13 Jan 2003 (1 ♂).

Tachysphex saturnus Arnold

Figures 332–335.

Tachysphex saturnus Arnold, 1924:52, ♀. Holotype: ♀, South Africa: Eastern Cape Province: Algoa Bay (TMP), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:276 (listed).

Tachysphex halictiformis Arnold, 1945:100, ♀, ♂. Lectotype: ♂, Madagascar: Bekily (MNHN), **here designated**, examined. **New synonym**.— Leclercq, 1960:98 (Madagascar), 1961:111 (Madagascar); Bohart and Menke, 1976:274 (listed); Leclercq, 1990b:117 (Madagascar); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

LECTOTYPE SELECTION.— Arnold described *halictiformis* from two females and two males, and designated a female from Ranomafana and a male from Bekily as types. Designating the female was contrary to Article 72.1.1 of the Code, because the specimen was not included in the original description. I have selected the male as the lectotype.

RECOGNITION.— *Tachysphex saturnus* is an all black species with punctate mesopleuron (interspaces shiny), a flat labrum, and both ends of crossvein cu-a nearly equidistant from the wing base. The notaulus of most specimens is easily recognizable, at least as wide and deep as the admedian line (Fig. 334a).

The female is further characterized by two lateral incisions on each side of the clypeal lip (Fig. 332a), the outer margin of the forebasitarsus somewhat expanded subbasally (hence most of the outer margin is slightly concave), hindtarsomere IV as wide as long, and the apical tarsomeres without ventral spines but with a convex apical margin.

The male has a distinctive clypeus whose lip is separated from the bevel by a deep constriction and reduced laterally; and the lobe is delimited laterally by a small tubercle at its free margin (Figs. 332b-d).

JUSTIFICATION OF NEW SYNONYMY.— I could not find any constant character that would separate *saturnus* (continental Africa) and *halictiformis* (Madagascar and Comoros). The most obvious difference appears to be in the male clypeal lip, which is a rectangular or arcuate projection in the continental African specimens (Fig. 332b), but it is obtusely pointed in most those from Madagascar (Fig. 332c). In some Malagasy specimens, however, the lip is also a rectangular projection, like in the continental form, and many intermediates occur. Other character show similar variation. The Malagasy and the continental African populations are clearly conspecific, and their names are synonyms.

DESCRIPTION.— Scutal and mesopleural punctures varying from large to minute and from about one to several diameters apart; interspaces unsculptured, shiny. Notaulus at least as conspicuous as admedian line in most specimens (Fig. 334a), evanescent in some from continental Africa. Axilla somewhat swollen adlaterally and abruptly sloping down laterally. Punctures of mesothoracic venter 1–3 to several diameters apart. Episternal sulcus complete or incomplete. Propodeal dorsum irregularly or longitudinally ridged, irregularly rugose in some specimens, with ridges diverging posterad in most Malagasy specimens; apical half in many specimens irregularly transversely ridged (Fig. 332e); side ridged. Hindcoxal dorsum with inner margin carinate basally, carina slightly expanded basally.

Setae (numbers in parentheses represent setal length expressed as a fraction of basal mandibular width): straight, erect on postocellar area (0.3–0.4) and on each side of oral fossa next to occipital carina (0.3), inclined on scutum (0.2 anteriorly), inclined anterolaterad on propodeal dorsum (0.4) except laterally, suberect on midfemoral venter (0.2 in female, less than one midocellar diameter in male).

Head, thorax gaster, and legs black, mandible reddish mesally, apical tarsomeres dark brown (tarsi all reddish in some males). Frontal setae silvery in both sexes. Wing membrane infumate (only slightly so in many males); forewing costal vein light brown to brown, subcostal vein dark brown. Terga I–IV silvery fasciate apically in both sexes.

♀.— Labrum arcuate or (most specimens) broadly, shallowly emarginate. Clypeus (Fig. 332a): bevel slightly shorter than basomedian area in most specimens, as long as latter in some; lip free margin arcuate, with two lateral incisions on each side, shallowly emarginate mesally in some specimens. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 1.5–1.8 × apical width. Forefemoral venter minutely punctate, punctures several diameters apart. Dorsal foretibial surface with one spine or several suberect bristles; outer surface with one or two long bristles, without spines. Outer side of foretarsomere I with 8–11 rake spines, outer margin slightly expanded subbasally (thus slightly concave between expansion and apex). Length of hindtarsomere IV equal to apical width; dorsoapical emargination almost rectangular; apicoventral margin roundly concave (Figs. 333a, c). Hindtarsomere V slightly longer than in most *Tachysphex* (Figs. 333a, b), venter with apicomedian bristle, apicoventral margin convex, lateral margin without spines (Fig. 333d); inner claws of mid- and hindtarsi slightly larger than outer claws (opposite on foretarsus). Apical depression of tergum V either all glabrous or setose mesally. Pygidial plate mostly impunctate (with punctures concentrating near margins), interspaces practically unsculptured. Length 7.2–8.9 mm.

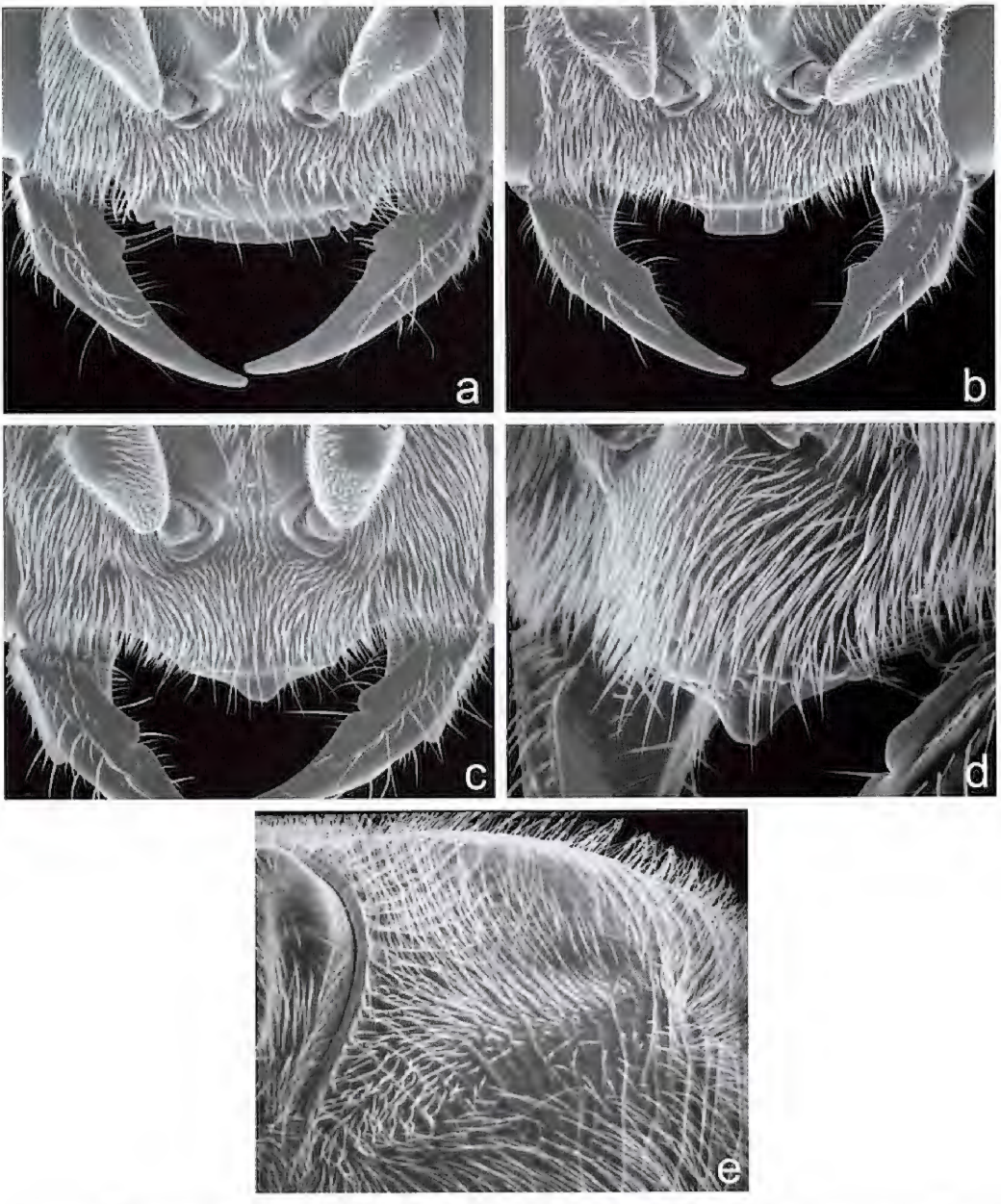


FIGURE 332. *Tachysphex saturnus* Arnold: a – female clypeus and mandible (×44); b – clypeus of male from continental Africa (×51); c – clypeus of male from Madagascar (×60); d – clypeus of male from Madagascar in lateral oblique view (×120); e – propodeal dorsum of female from Madagascar in lateral oblique view (×72).

♂.— Mandible: trimmal carina with tooth (tooth low, inconspicuous in some specimens), with or without cleft. Clypeus (Figs. 332b-d): constricted between lip and bevel; bevel markedly shorter than basomedian area; lip varying from obtusely pointed (many Malagasy specimens) to arcuate or rectangular projection that is narrower than lobe; corner of median lobe with small, round to

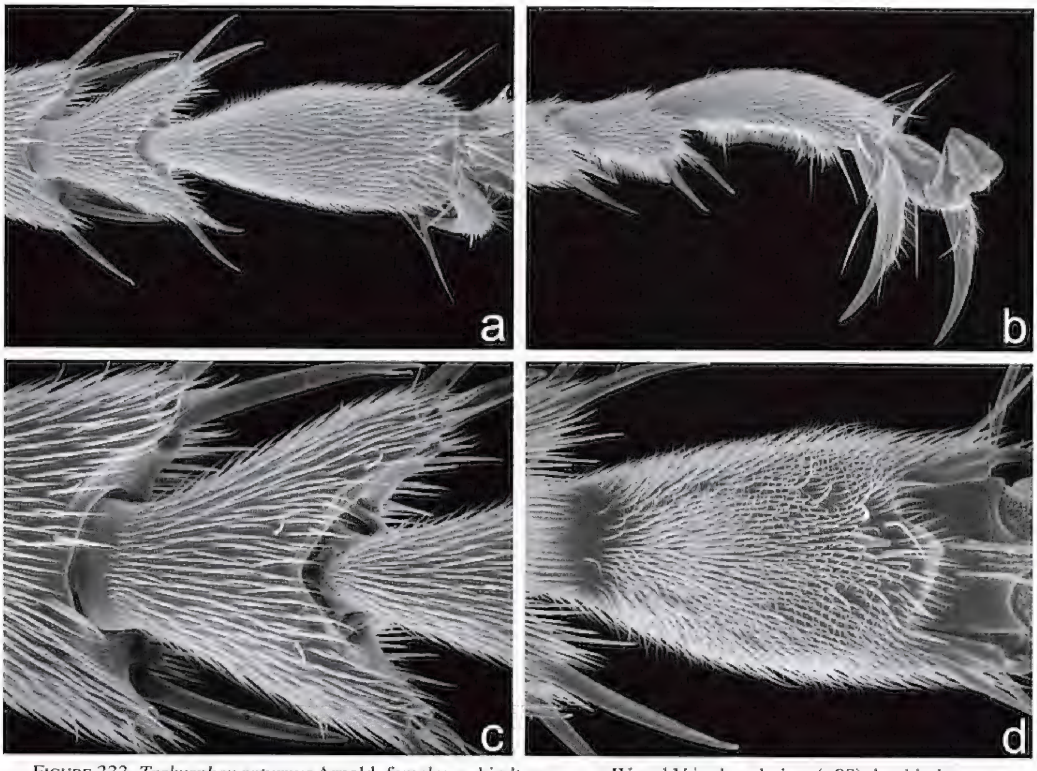


FIGURE 333. *Tachysphex saturnus* Arnold, female: a –hindtarsomeres IV and V in dorsal view (×90); b – hindtarsomeres IV and V in lateral view (×72); c – hindtarsomere IV in dorsal view (×187); d – hindtarsomere V in ventral view (×180).

nearly rectangular tooth that is slightly removed from free margin but that superficially looks like lip corner; distance between teeth about 0.8–0.9 × distance between corner and orbit. Width of postocellar area 1.2–1.5 × length. Dorsal length of flagellomere I 1.0–1.5 × apical width, ventral length varying from less than to more than apical width; flagellomeres III–IX in some specimens with longitudinal groove that delimits two differently setose areas (as in Figs. 98c-f). Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than this tarsomere's apical width. Venter of tarsomeres V with one or two thin spines near apex (spines rudimentary in smallest specimens). Length 5.2–8.5 mm. Volsella and penis valve: Figs. 334b, c.

VARIATION.— The scutal hindcorner is markedly prominent in specimens from West Africa and those from Madagascar and the Comoro Islands (Fig. 334a), but nonprominent in southern African populations.

In the male, the dorsal length of flagellomere I is 1.0–1.2 × apical width, equal to about 0.75 of II, with the ventral length being less than apical width in specimens from West Africa, Madagascar and the Comoro Islands. In southern African specimens, the dorsal length of flagellomere I is 1.4–1.5 × apical width, and the ventral length varies from less than to more than apical width.

GEOGRAPHIC DISTRIBUTION (Fig. 335).— Ivory Coast to South Africa, Madagascar, and Comoro Islands.

RECORDS.— **BOTSWANA**: Xugama (1 ♀, PMA). **COMORO ISLANDS**: **Grand Comore**: Itsandra

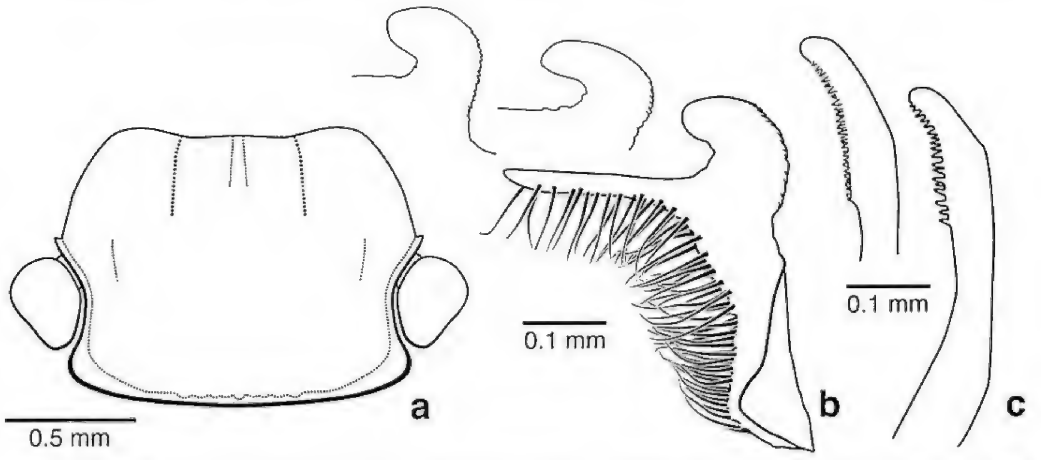


FIGURE 334. *Tachysphex saturnus* Arnold: a – female scutum; b – volsella with outlines showing variation of dorsal process; c – penis valve with outline showing variation.

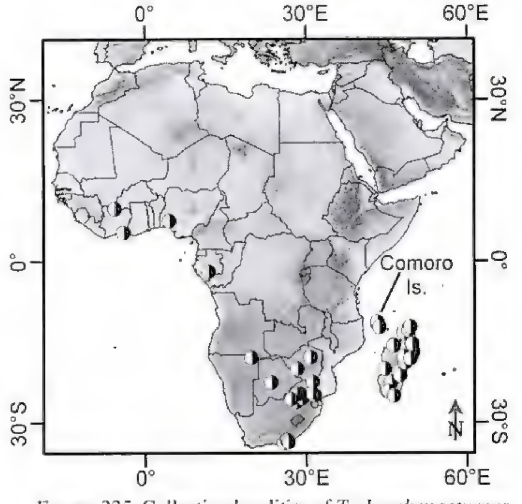


FIGURE 335. Collecting localities of *Tachysphex saturnus*.

(1 ♂, KMG), Kourani (2 ♀, MRAC), Le Galawa Hotel (1 ♀; 1 ♀, KMG). **Mohéli**: Miringoni (2 ♀, 1 ♂; 5 ♀, 2 ♂, MRAC). **GABON**: Akou (1 ♂, FSAG). **IVORY COAST**: Abidjan: Cocody (1 ♀, 1 ♂; 2 ♀, 4 ♂, MSNT), 30–35 km N Korhogo (1 ♂; 2 ♂, ZMAN). **MADAGASCAR**: no specific locality (1 ♀, BMNH). **Antsiranana**: Forêt d'Orangea 3.6 km SE Ramena (1 ♂), Reserve Spéciale d'Ankarana 2.6 km E Andrafiabe (1 ♀), Montagne d'Ambre National Park at 12°30′52″S 49°10′53″E (12 ♀, 5 ♂) and 12°31′1″S 49°10′5″E (2 ♀, 1 ♂), Nosy-Bé Island: Dzamandzar (1 ♂, LB), 1 km W Sakalava Beach (2 ♂), 3 km W Sakalava Beach (1 ♀, 1 ♂). **Fianarantsoa**: 40 road km W Ihosy (1 ♀, 1 ♂), Ivato (1 ♀, LB), Ranomafana (9 ♀, 2 ♂; 2 ♀, LB; 1 ♂, MNHN). **Mahajunga**: Amborovy 8 km NE Mahajunga (1 ♀, 1 ♂), Katsepy (1 ♀, 3 ♂, NHMW). **Toamasina**: Ambaton-drazaka (1 ♂; 3 ♀, MRAC), Ampasimanolotra (as Brickaville): Ambila-Lemaitso (1 ♀, LB), near entrance to Andasibe National Park at 18°55.6′S 48°24.5′E (3 ♀, 1 ♂), Fampanambo at 15°25′S 49°40′E (Leclercq, 1991), Forêt de Ambohidena (1 ♀, NHMW), Ivoloina (3 ♀, 2 ♂, LB), Mahabo (2 ♀, MRAC), Mahavelona (2 ♂; 2 ♀, LB; 1 ♀, MHNB; 17 ♀, 19 ♂, MRAC), Mananara (1 ♀, MRAC), Maroantsetra (1 ♂, MHNB), Morarano-Chrome (2 ♀, MRAC), Soanierana-Ivongo (1 ♀, MHNB), Toamasina (13 ♀, MRAC). **Toliara**: Bekily (2 ♂, MHNH, including lectotype of *halictiformis*), Bereboka 60 km NE Morondava (1 ♀, BMNH), Berenty (1 ♂). **NAMIBIA**: **Rundu District**: Rundu (1 ♀, MS). **NIGERIA**: Ile-Ife (1 ♀, AEI). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (1 ♀, TMP, holotype of *saturnus*), 18 km WNW Grahamstown: Hilton Farm (1 ♀, AMG), Howison's Poort 6 km WSW Grahamstown (17 ♀, 10 ♂, AMG), Kenton-on-Sea (1 ♂, AMG). **Gauteng**: Edenvale (1 ♂, AMG). **Mpumalanga**: Loskop Dam Nature Reserve (1 ♂, PPRI), Skukuza in Kruger National Park (1 ♀, PMA). **Northern Province**: Guernsey Farm 15 km E Klaserie (1 ♂, PMA), 10 km SW Naboomspruit (1 ♂, FSCA), Pafuri in Kruger National Park (1 ♀, PPRI), Rustenburg Nature Reserve (2 ♂, PPRI), 5 mi W Warmbad (1 ♀, 1 ♂, USNM). **ZIMBABWE**: Lion and Cheetah Park 24 km W Harare (5 ♀, 1 ♂), Redbank at Kami River (1 ♂), Victoria Falls (1 ♀, 1 ♂).

***Tachysphex scaber* Pulawski, sp. nov.**
Figures 336, 337.

Derivation of name.— *Scaber*, Latin for rough, scabby, mangy; with reference to the thoracic sculpture.

Recognition.— Like *asinus* and *onager*, *scaber* has the supraantennal swelling punctate and setose (rather than impunctate, glabrous), propodeal side ridged, legs largely red, and gaster at least partly red. In the female, flagellomeres III–X are flattened laterally, each with a characteristic sensory area (as in Figs. 38c-e), the pygidial plate is punctatorugose in most specimens (as in Figs. 39a, b) but closely punctate in some, and the length of midtarsomere II is less than twice its width. The species differs from the other two by its coarser scutal punctation (the punctures are slightly larger than those on the postocellar area and many times those on the postocellar impression). In the male, the clypeal lip is arcuate (obtusely pointed in *onager*), the forefemoral posteroventral surface is impunctate at least in apical third (forefemur densely punctate in *asinus*), and the sternal setae are appressed or nearly so except for the usual few erect setae at the base of each apical depression (in *onager* and most *asinus*, the setae are suberect on the apical depressions of sterna III–VI).

Description.— Labrum convex apically, slightly protruding beyond clypeal free margin. Galea shiny, with well-defined punctures that vary from about one to several diameters apart, as long as 0.8 of scape. Supraantennal swelling ill defined, punctate and setose. Scutal punctures well defined, conspicuous, most or all being less than one diameter apart. Mesopleural punctures conspicuous, well defined, averaging about one diameter or less apart. Episternal sulcus complete or nearly so. Propodeal dorsum markedly, irregularly rugose; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect on each side of oral fossa next to occipital carina, about 1.5 × midocellar diameter long; appressed on postocellar area and scutum; oriented posterad on propodeal dorsum.

Head and thorax black, mandible reddish preapically. Frontal and clypeal setae with golden tinge in female, golden in male. Wing membrane yellow, somewhat darkened in apical two fifths or so; costal and subcostal veins of forewing reddish brown. Coloration of femora and gaster: see below. Tibiae and tarsi red. Terga I–III or I–IV fasciate apically, fasciae silvery or golden (ill defined in some specimens).

♀.— Clypeus (Fig. 336a): bevel about as long as basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.5–1.6 × apical width, flagellomeres VII–IX about as wide as long; flagellomeres III–X flattened laterally, with characteristic sensory areas (as in Figs. 38c-e). Forefemoral venter, at least in apical half, unsculptured except for large, sparse punctures, unsculptured zone extending onto posterior surface near apex. Midfemoral posterior surface unsculptured or nearly so near apex. Dorsal foretibial surface with two spines or a few suberect, inconspicuous bristles; outer surface with 1–3 setae, narrowly asetose. Tarsi short: length of fore- and midtarsomeres II 1.1–1.2 and 1.6 × apical width, respectively; that of midtarsomere III 1.0–1.1 × apical width; of fore-, mid-, and hindtarsomeres IV 0.9–1.0, 0.9, and 1.0 × apical width, respectively. Forebasitarsus with 11–14 rake spines. Apical depression of tergum V varying from setose to asetose. Pygidial plate incised apically, punctatorugose in most specimens but punctate in single female from Natal (in which punctures are of two sizes: small, dense, and large, sparse; most small punctures about one diameter apart). Length 11.6–13.4 mm. Forefemur black (red apically), mid- and hindfemora red except black basally. Gastral segments I and II or I–III red, remainder black.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 336b) with small, obtuse carina emerging from each lip corner; bevel varying from markedly shorter to about as long as baso-

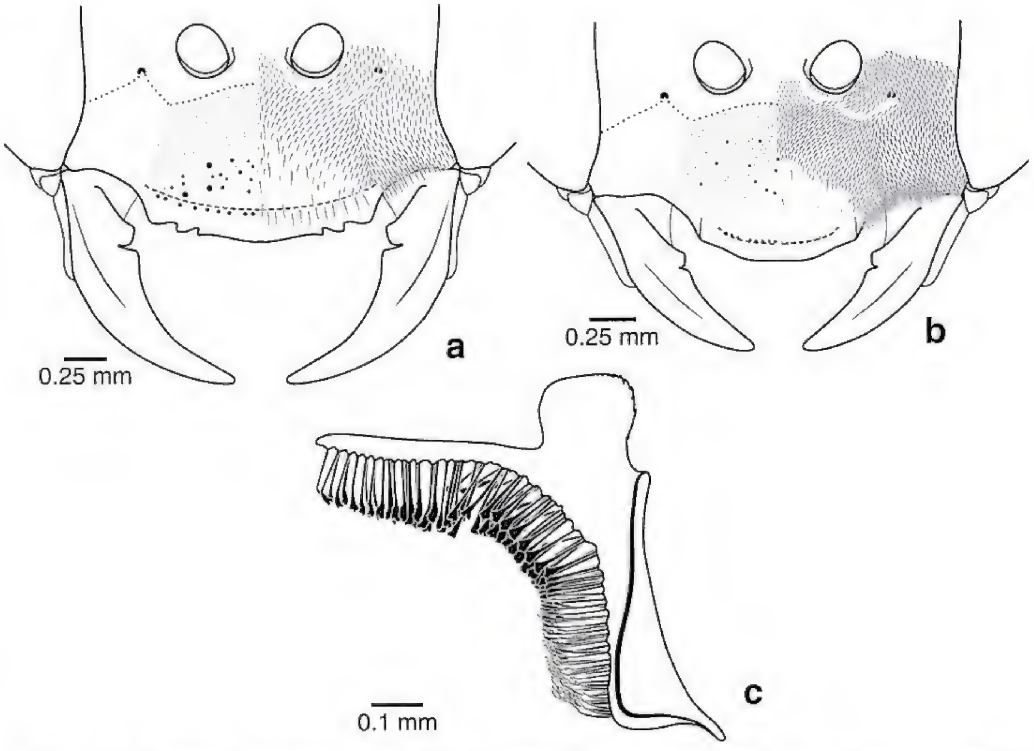


FIGURE 336. *Tachysphex scaber* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella.

median area; lip free margin arcuate, with well-defined corner; distance between corners 1.0–1.1 × distance between corner and orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.2–1.3 × apical width, equal to about 0.7 of II; ventral length equal to apical width or slightly smaller. Forefemoral venter, in apical third or so, unsculptured except for a few, sparse punctures (unsculptured area either narrow or wide). Forefemoral notch microscopically setose, margined posteriorly. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length of midtarsomeres II and III 1.7–2.0 and 1.2 × apical width, respectively. Venters of tarsomeres V each with one or two small, preapical spines. Sternum VIII tridentate apically. Length 10.0–10.4 mm. Volsella: Fig. 336c, penis valve as in *asinus* (see Fig. 40c). Femora black to largely red (black basodorsally). Gaster red or with apex slightly darkened or (specimens from Zoutpansberg area, South Africa) segments I–III red, remainder black.

GEOGRAPHIC DISTRIBUTION (Fig. 337).— Namibia, Botswana, Zambia, Zimbabwe, northeastern South Africa.

RECORDS.—HOLOTYPE: ♂, **ZAMBIA**: 25 km E Lusaka at 15°21′S 28°30′E, 14 Mar 1995, WJP (CAS). PARATYPES: **BOTSWANA**: Gemsbok Pan, 23 Apr–5 May 1930, Vernay-Lang Kalahari Expedition (1 ♀, TMP, determined *asinus* by G. Arnold). **NAMIBIA**: **Ondangwa District**: 38 km SE Ondangwa, 9 May 1971, collector unknown (1 ♀, NMN). **Rundu District**: Rundu at 17°53.4′S 19°46.9′E, 27–31 Mar 1997, M. and O. Niehuis (1 ♂; 1 ♂, OHL). **SOUTH AFRICA**: **Kwazulu-Natal**: Natal, no specific locality or date, Frere (1 ♀, SAM, determined *asinus* by G. Arnold). **Northern Province**: "N.E. Zoutp. dist." [probably NE Zoutpansberg near Louis Trichardt], July and Aug 1916, H.G. Breyer (1 ♀; 2 ♂, TMP). **ZAMBIA**: Lusaka,

25 June 1974, E.F. Mambanda (1 ♀, UCD). **ZIMBABWE**: Bulawayo, R. Stevenson, 28 Mar 1923 (1 ♀, SAM; 1 ♂, TMP), 8 May 1923 (1 ♀, SAM), 29 June 1923 (1 ♂, SAM), 17 Mar 1924 (1 ♂, SAM), 6 Apr 1924 (1 ♂, TMP), and 12 Apr 1924 (1 ♂, SAM); Gwanda, Apr 1937, R.H.R. Stevenson (1 ♂; 1 ♂, AMG; 2 ♂, SAM); Sawmills at Umguza River, 2 May 1917, G. Arnold (1 ♀, TMP); Shashe River near Tuli, 2–14 May 1959, no collector's name (1 ♀, SAM).

Tachysphex scaurus Arnold

Figures 338–341.

Tachysphex scaurus Arnold, 1945:98, ♀, ♂. Lectotype: ♀, Madagascar: Bekily (MNHN), **here designated**, examined.— Leclercq, 1961: 110 (Madagascar); Bohart and Menke, 1976:276 (listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

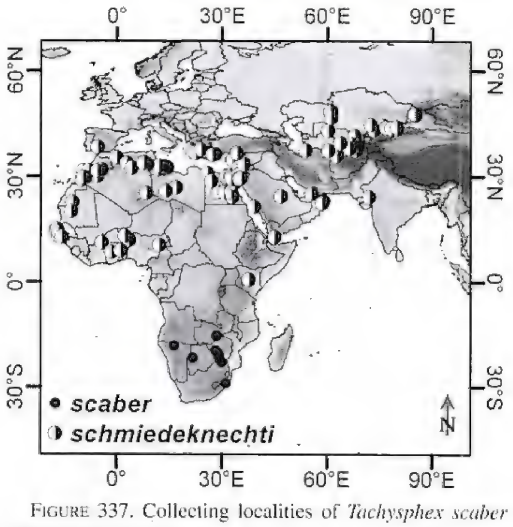


FIGURE 337. Collecting localities of *Tachysphex scaber* and *schmiedeknechti*.

RECOGNITION.— *Tachysphex scaurus* is known only from Madagascar and Aldabra Island. In the female, tarsomeres IV are wider than long (Fig. 338b), and their apicoventral margins are roundly prominent mesally; tarsomeres V are angulate basoventrally, each with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe (Fig. 338d); and one claw of each leg is smaller than the other. In addition, the scutum and scutellum are flattened. Unlike *suavis* and *subcoriaceus*, the other Madagascan species with these characteristics, the female of *scaurus* has 8–10 rake spines on the forebasitarsus (the apical three or four spines with sockets contiguous), 4–6 rake spines of foretarsomere II (the apical three or four with sockets contiguous), and the outer margin of foretarsomeres III and IV is markedly shorter than the inner margin. Females of the other two species have 5–7 rake spines on the forebasitarsus (of which only the apical two have contiguous sockets), two or three rake spines on foretarsomere II (of which only the apical two have contiguous sockets), and the outer and inner margins of foretarsomere III are about equal in length.

The male of *scaurus* is unique among Madagascan species in having expanded lateral margins of the apical tarsomeres, each expansion with a row of minute spines (Fig. 339d). It also has black tibiae and silvery frontal setae. The apical tarsomeres are also expanded in the African *auropilosus* and *hippolyta* and the Oriental *changi*. In the first two, however, the tibiae are red, the frontal setae are golden, and the clypeus is a different shape (compare Figs. 339a, 48b, and 184b). In *hippolyta*, in addition, the lateral expansions of apical tarsomeres lack the small spines. Unlike *changi*, the mesopleural punctures of *scaurus* are minute (rather than conspicuous), the setae are appressed on the postocellar area and scutum (rather than erect), and the clypeal lobe is broad (distance between lobe corners more than distance between a corner and orbit, while less than that in *changi*).

DESCRIPTION.— Scutal punctures, on disk, up to 2–3 diameters apart in some females and up to several diameters on disk in others, 1–2 diameters apart in male; interspaces evenly microareolate. Mesopleuron beneath scrobe and mesothoracic venter with punctures that average several diameters apart in female, about 2–3 diameters in male; interspaces evenly microareolate. Episternal sulcus complete in some specimens. Propodeal dorsum irregularly, longitudinally ridged (ridges evanescent posteriorly in small males), side ridged. Hindcoxal dorsum with inner margin carinate, carina somewhat expanded basally.

Setae in most specimens straight: erect on postocellar area (length about 1.0–1.5 × midocellar diameter), slightly sinuous in single female from Montagne d'Ambre, Madagascar; erect on each side of oral fossa next to occipital carina (length about 0.4 × basal mandibular width); nearly appressed on scutum (length about 1.0 × midocellar diameter); inclined toward coxa on midfemoral venter (longest setae about 0.3 of basal mandibular width); oriented obliquely anterad on propodeal dorsum (but lateral setae oriented posterad and meeting apicomesally). A female from Amborovy differs in having the setae sinuous and markedly longer (about 0.4 basal mandibular width) on postocellar area, next to hypostomal carina, and on scutum (scutal setae erect).

Head, thorax, legs, and gaster black except mandible largely reddish, also pygidial apex reddish in most females; tarsal apex brown reddish. Frontal setae silvery in both sexes. Wing membrane nearly hyaline; forewing costal vein brown, subcostal vein dark brown. Terga I–IV (I–V in some males) silvery fasciate apically.

♀.— Labrum emarginate. Clypeus (Fig. 338a): bevel as long as basomedian area or longer; lip free margin arcuate, shallowly emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.2–1.5 × length. Dorsal length of flagellomere I 2.2–2.5 × apical width. Scutum and scutellum flattened. Fore- and midtrochanteral venters unsculptured or alutaceous and with a few punctures that are many diameters apart. Fore- and midfemoral venters and posterior surfaces with well-defined punctures that are many diameters apart; interspaces unsculptured or nearly so. Dorsal foretibial surface with several suberect, inconspicuous bristles; outer surface impunctate, glabrous except for a few fine bristles, without spines. Forebasitarsus with 8–10 rake spines.

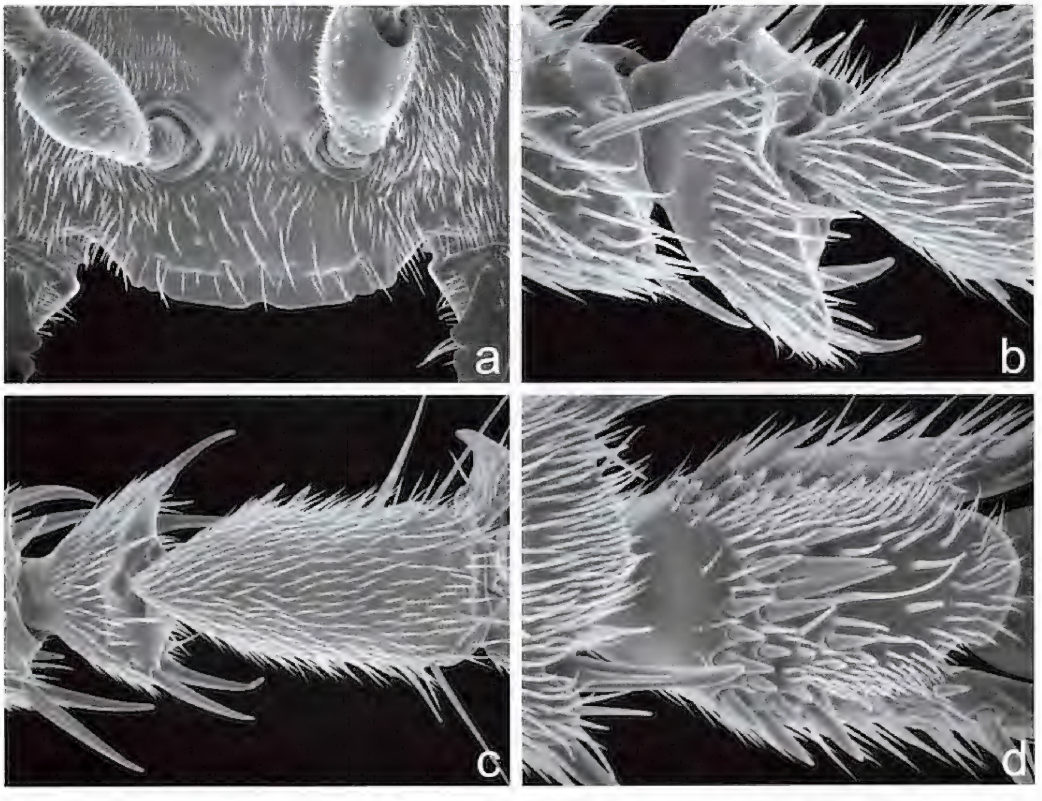


FIGURE 338. *Tachysphex scaurus* Arnold, female: a – clypeus (×60); b – foretarsomere IV (×240); c – hindtarsomeres IV and V (×168); d – hindtarsomere V in ventral view (×300).

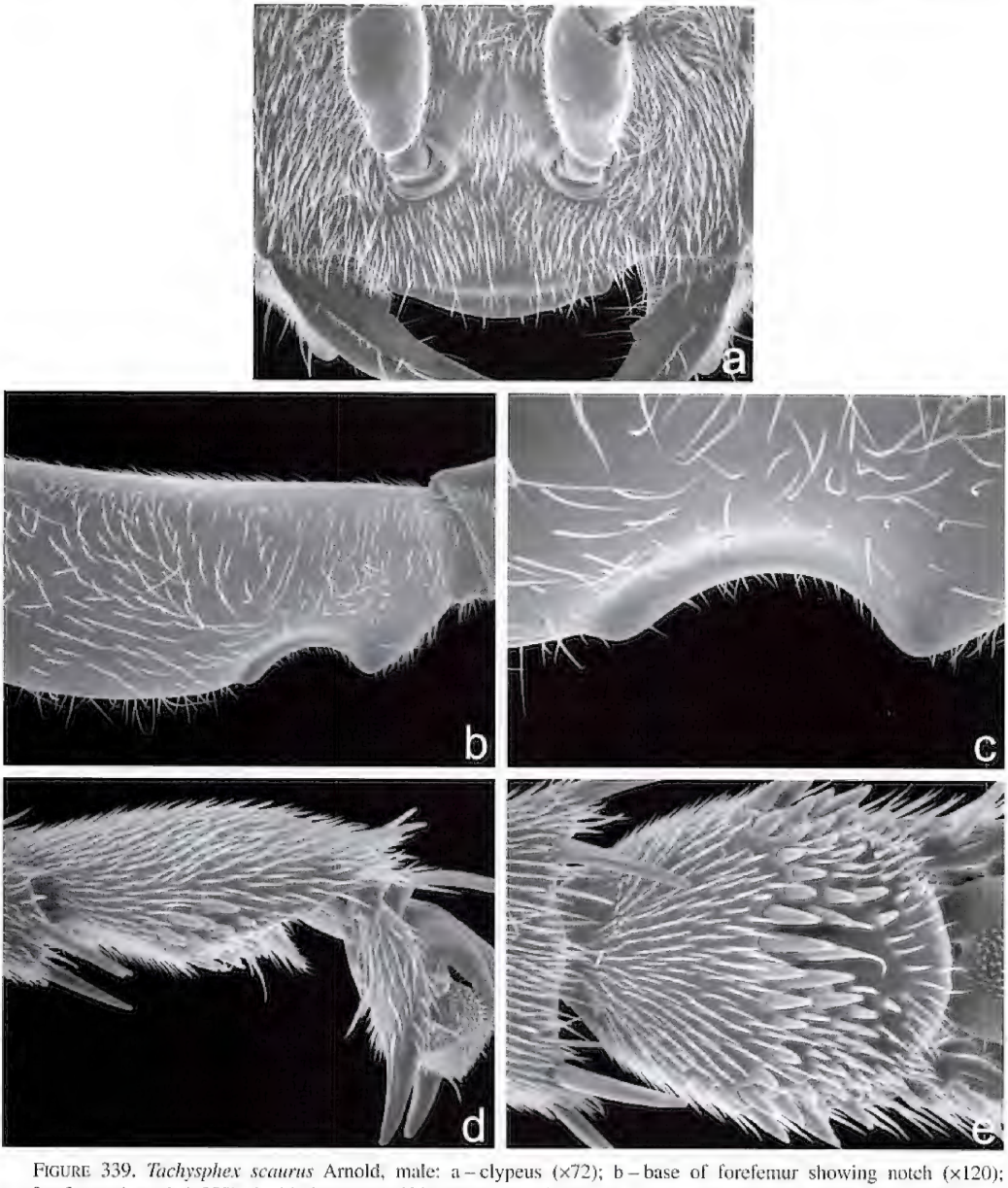


FIGURE 339. *Tachysphex scaurus* Arnold, male: a – clypeus (×72); b – base of forefemur showing notch (×120); c – forefemoral notch (×300); d – hindtarsomere V in lateral view (×240); e – hindtarsomere V in ventral view (×360).

Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV (Fig. 338b, c) wider than long, with dorsoapical margin broadly emarginate, almost straight and apicoventral margin obtusely prominent; outer margin of foretarsomeres III and IV markedly shorter than inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; each lateral margin with several small spines subbasally (Figs. 338c, d), apicoventral margin produced into lobe (Fig. 338d). Outer claws of mid- and hindtarsi shorter, thinner than inner claws (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous. Pygidial plate punctate, punctures

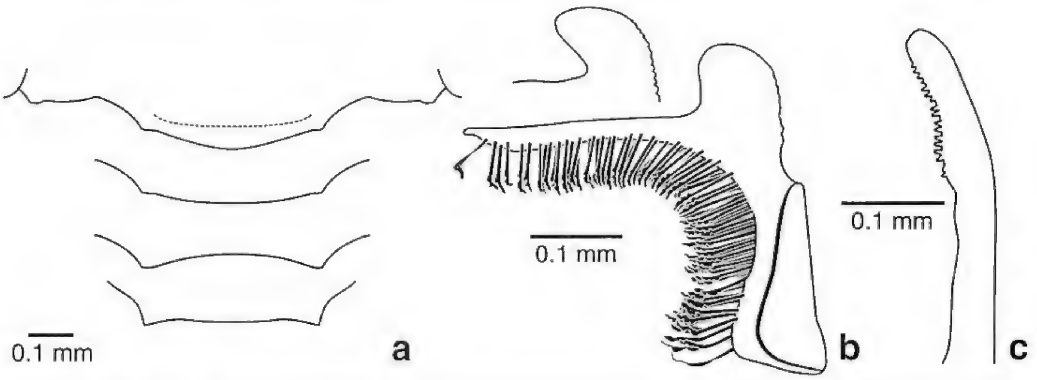


FIGURE 340. *Tachysphex scaurus* Arnold: a – individual variation of clypeus; b – volsella with outline showing variation; c – penis valve.

averaging several diameters apart; interspaces unsculptured or nearly so. Length 6.2–9.0 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft. Clypeus (Figs. 339a, 340a): bevel absent or ill defined, shorter than basomedian area; lip free margin arcuate, sinuate, nearly straight, or concave, with well-defined corner; distance between corners 1.2–1.3 × distance between corner and orbit. Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width, equal to about 0.7 of II. Forefemoral notch with microscopic, erect setae (Figs. 339b, c). Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with preapical cluster of small spines (Fig. 339e); lateral margins obtusely expanded, each with several small spines subbasally (Fig. 339e). Sterna IV–VI densely punctate on apical depressions (punctures 1–2 diameters apart), remainder with punctures that are several diameters apart. Length 5.6–6.2 mm. Volsella and penis valve: Figs. 340b, c.

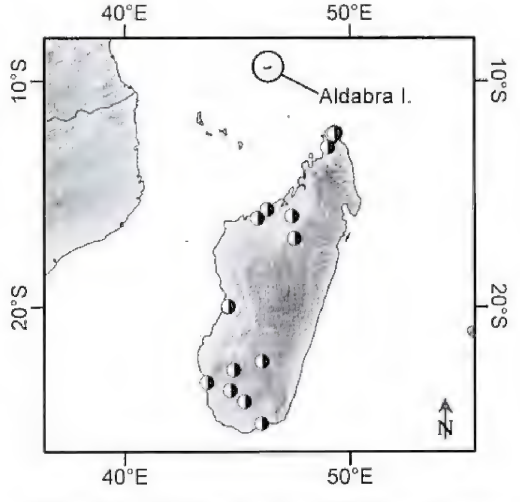


FIGURE 341. Collecting localities of *Tachysphex scaurus*.

GEOGRAPHIC DISTRIBUTION (Fig. 341).— Madagascar, Aldabra.

RECORDS.— MADAGASCAR: Antsiranana: Forêt d'Orangea 3.6 km SE Ramena (1 ♀, 1 ♂), 7 km N Joffreville at 12°20′S 49°15′E (1 ♀), Parc National Montagne d'Ambre at 12°31′13″S 49°10′45″E (6 ♀, 1 ♂), Reserve Spéciale d'Ankarana 2.6 km E Andrafiabe (1 ♀), Sakalava Beach at 12°15′46″S 49°23′51″E (1 ♂), 1 km W Sakalava Beach (2 ♀, 4 ♂). **Fianarantsoa**: Ihosy (1♂, MNHN, paralectotype of *scaurus*). **Mahajanga**: Amborovy 8 km NE Mahajanga (5 ♀, 4 ♂), Forêt d'Ambohimanga at 15°57′46″S 47°26′17″E (3 ♂), Mahatazana (1 ♀, MHNB), Mahavavy River 6.2 km SE Mitsinjo at 16°03′06″S 45°54′30″E (3 ♂). **Toliara**: Ambovombe (1 ♂, MHNB), Bekily (1 ♀, MNHN, lectotype of *scaurus;* 2 ♀, SAM, including one paratype of *scaurus*), Bereboka 60 km NE Morondava (1 ♀, 1 ♂, BMNH; 1 ♀, MRAC), Beza Mahafaly (2 ♂, KU), 50 km NE Morondava (3 ♀, 1 ♂; 10 ♀, 2 ♂, MRAC), 38 km E Sakaraha (2 ♀, 1 ♂), Toliara (1 ♀, LB). **SEYCHELLES: Aldabra**: Ile Michel (2 ♂, BMNH).

***Tachysphex schmiedeknechti* Kohl**
Figures 337, 342, 343.

Tachysphex schmiedeknechti Kohl, 1883a:170, ♀ (as *Schmiedeknechti*, incorrect original capitalization). Lectotype: ♀, Greece: Attica: Egina, also spelled Aegina, now Aiyina (NHMW), **here designated**, examined.— Kohl, 1885:375 (in revision of Larrini); Dalla Torre, 1897:685 (in catalog of world Hymenoptera); de Beaumont, 1940:171 (in revision of Egyptian *Tachysphex*); Honoré, 1942:56 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:185 (in revision of Egyptian *Tachysphex*), 1950a:405 (Algeria), 1950b:20 (Egypt); Gussakovskij, 1952:240 (Transcaspia); Bytinski-Salz, 1956:226 (Turkey); de Beaumont, 1956a:197 (Libya), 1958:61 (Algeria), 1960a:18 (Greece: Island of Rhodes), 1960b:238 (Libya), 1965:48 (Greece); Myartseva, 1965:77 (Turkmenistan); Pulawski, 1967:398 (Turkey), 1971:389 (in revision of Palearctic *Tachysphex*); Myartseva, 1972a:79 (Turkmenistan), 1972b:112 (chrysidid parasite); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Bohart and Menke, 1976:276 (listed); Myartseva, 1976:77 (nesting habits); Kazenas, 1978:114, 126 (in key to Sphecidae of Kazakhstan and Central Asia); Guichard, 1980:227 (Oman); Gayubo and Mingo, 1988:82 (Spain); Dollfuss, 1989:13 (type material in NHMW); Guichard, 1991:339 (Jordan); Krombein and Pulawski, 1994:13 (summary of nesting habits), 93 (in revision of Sri Lankan *Tachysphex*); Roche and Zalat, 1994:115 (Egypt: Sinai); Kazenas, 2001:30 (in checklist of Sphecidae of Kazakhstan and Central Asia), 160 (summary of nesting habits); Schmid-Egger and Bitsch *in* Bitsch et al., 2001:271 (in Sphecid Fauna of Western Europe); Kazenas, 2002:75 (Kazakhstan); Gadallah and Assery, 2004:1396 (skeletal parts of sting apparatus).

Tachysphex psilopus Kohl, 1884:371, ♂. Holotype or syntypes: ♂, Egypt: Sinai Peninsula: Tor (NHMW), examined before 1971. Synonymized with *Tachysphex schmiedeknechti* by de Beaumont, 1940:171.— Dalla Torre, 1897:684 (in catalog of world Hymenoptera); Bingham, 1898:104 (Yemen).

Tachysphex heliophilus Nurse, 1909:515, ♀, ♂. Lectotype: ♀, India: Gujarat: Deesa (BMNH), designated by Pulawski, 1975:312, examined in 1974. Synonymized with *Tachysphex schmiedeknechti* by Pulawski, 1975:312.

Tachysphex ornatipennis Gussakovskij, 1933:283, ♂. Holotype: ♂, former Persian province Seistan, now part of Iran and Afghanistan: no specific locality (ZIN), reexamined in 2006. Synonymized with *Tachysphex schmiedeknechti* by Pulawski, 1971:389.

Tachysphex fasciipennis Gussakovskij, 1933:283, ♂. Holotype: ♂, Turkmenistan: Farab (ZIN), reexamined in 2006. Synonymized with *Tachysphex schmiedeknechti* by Pulawski, 1971:389.— Myartseva, 1963:58 (Turkmenistan).

Tachysphex calopteryx Gussakovskij, 1933:284, ♀. Holotype: ♀, Turkmenistan or Uzbekistan: Kara-Dzhuzgun sands near Aral Lake in Kara Kum Desert (ZIN), reexamined in 2006. Synonymized with *Tachysphex schmiedeknechti* by Gussakovskij, 1952:240.

Tachysphex schmiedeknechti satanas Pulawski, 1971:393, ♀, ♂. Holotype: ♀, Syria: Ramadan near Damascus (MSNT), examined before 1971. Synonymized with *Tachysphex schmiedeknechti* by Pulawski *in* Krombein and Pulawski, 1994:94.— Bohart and Menke, 1976:276 (listed).

Recognition.— *Tachysphex schmiedeknechti* can be recognized by a conspicuously reticulate scutum and mesopleuron (Fig. 342c), widely spaced rays of the inner hindtibial spur (Fig. 343b), and female flagellomeres IV–X flattened laterally, with a well-defined ventral edge. A similar sculpture is found on the scutum and mesopleuron of *prosopigastroides* and on the mesopleuron of most *mediterraneus*, a similar hindtibial spur in *micans*, some *pulcher*, the female of *crocodilus*, and most females of *speciosissimus*, whereas *prosopigastroides* has a similar female flagellum. The combination of the three characters, however, is unique to *schmiedeknechti*. A dark transverse band on the forewing found in most specimens (Fig. 342d) is a subsidiary recognition feature (forewing all infumate in occasional specimens, Fig. 342e).

Description.— Supraantennal swelling triangularly prominent, although less so than in *prosopigastroides*, and evenly rounded in smallest males. Scutum and mesopleuron characteristically reticulate (Fig. 342c). Propodeal dorsum rugose, irregularly ridged longitudinally near base;

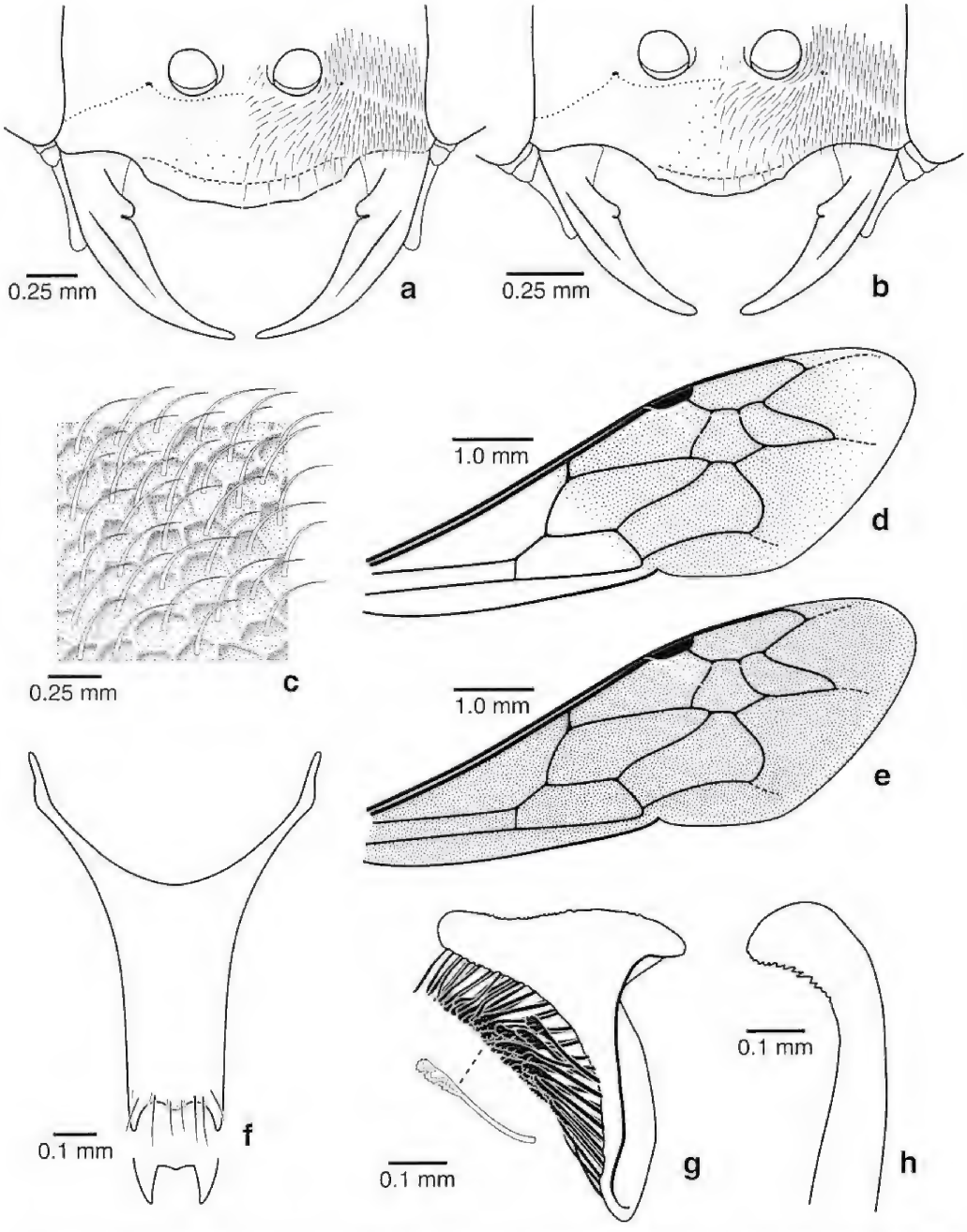


FIGURE 342. *Tachysphex schmiedeknechti* Kohl: a – female clypeus and mandible; b – male clypeus and mandible; c – scutal sculpture; d – forewing of average specimen; e – forewing of melanic specimen; f – male sternum VIII with outline showing individual variation; g – volsella; h – penis valve.

side ridged; posterior surface, in dorsal third or so, with wide median impression. Hindwing crossvein cu-a oblique in some specimens, with anal end further away from wing base than cubital end. Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Inner spur of hindtibia with thick, widely spaced rays (Fig. 343b). Apical tarsomeres with several long, erect spines on venter, but no spines on lateral margins. Sternum I, in many specimens, with longitudinal carina.

Setae (figures in parentheses refer to length expressed as a fraction of basal mandibular width): erect, sinuous on postocellar area (0.4–0.7) and on each side of oral fossa next to occipital carina (0.7–0.8); sinuous, suberect on frons and scape; evenly curved, oriented posterad on scutum except suberect, sinuous anteriorly; sinuous, oriented posterad on propodeal dorsum except oriented anterad anteromesally; nearly erect on midfemoral venter; suberect on tergum I basolaterally (about 0.5). Sternum I in many specimens largely glabrous.

Head and thorax black. Frontal setae silvery in female and small males, golden (all or partly) in large males. Forewing in most specimens with dark, transverse band (Fig. 342d) that is faint in some females; conspicuously yellow between base and band in Ghanaian and some Senegalese specimens; all wings markedly infumate in some specimens from Algeria, Morocco, and Syria (Fig. 342e). Legs black (tarsal apex reddish), hindtibia partly red in some males; hindfemur (all or partly) and hindtibia red in males from Gambia and Ghana and most from Niger and Senegal, also midtibia in some. Gaster all black in most females and some Syrian males (that were described as *schmiedeknechti satanas* by Pulawski, 1971), but terga I–III red in most males and also in females from Ghana, Nigeria, and some from Senegal. Terga I–III silvery fasciate apically in female, not fasciate in male.

♀.— Clypeus (Fig. 342a): middle section irregularly punctate (large punctures intermixed with small ones), bevel ill defined or not differentiated from basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 2.5–3.2 × apical width; flagellomeres III–X flattened laterally, with well-defined ventral edge, and inner and outer surfaces differently sculptured. Punctures of forefemoral venter several diameters apart. Dorsal foretibial surface with two or three spines; outer surface with one to three spines, in some specimens sparsely punctate and setose. Forebasitarsus with 7–9 rake spines. Pygidial plate unsculptured except for a few, sparse punctures, slightly constricted near apex, apex rounded. Length 8.0–11.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 342b): middle section irregularly punctate (large punctures intermixed with small ones), bevel not differentiated from basomedian area; lip free margin evenly arcuate, corner nonprominent; distance between corners 0.7–1.0 × distance between corner and orbit. Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 2.4–3.0 × apical width. Forefemoral notch glabrous, with pointed proximal margin and ill-defined distal margin (Fig. 343a). Outer margin of forebasitarsus with 5–8 rake spines. Sterna asetose (except for erect setae that delimit apical depressions); apical margin of sternum VIII in most specimens with median expansion (Fig. 342f). Length 6.0–10.0 mm. Volsella and penis valve: Figs. 342g, h.

NESTING BEHAVIOR.— Myartseva (1976) observed the nesting habits of *schmiedeknechti* on sandy banks of the Tedjen River in Turkmenistan. The burrows, 11–21 cm long, ended in a single cell 5–8 cm below the soil surface. As in other species of the genus, nest construction precedes hunting, and forelegs are used for digging. The nest entrance is closed when the wasp is away for hunting (confirmed by Kazenas, 2001). Prey are mantids, either adults of small species, or second and third instars of large species, and flown to the nest. One to three prey are stored per cell. Both females and males dig temporary galleries in which they stay overnight, but females also use unfin-

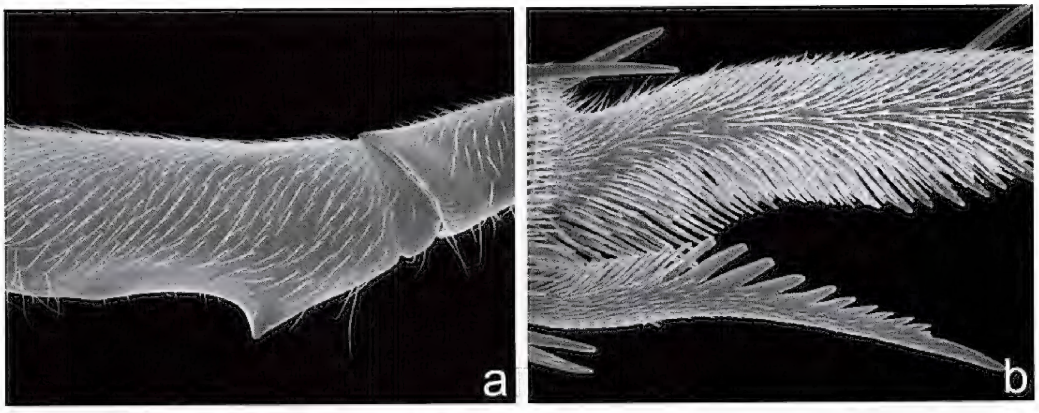


FIGURE 343. *Tachysphex schmiedeknechti* Kohl: a – forefemoral base of male (×72); b – inner hindtibial spur of female (×126).

ished nests. De Beaumont (1955) found a female carrying a prey, a paralyzed nymph of *Mantis religiosa* Linnaeus, in Morocco.

The males perch on the ground, small plants, or slight elevations, watching insects that fly around and obviously looking for females. From time to time they fly away and return to the same perch or go to another one (Kazenas, 2001).

Myartseva (1972b) reared *Chrysis decora* Mocsáry, 1887 (as *mesasiatica* Semenov, 1912), from a nest of this species.

GEOGRAPHIC DISTRIBUTION (Fig. 337).— North Africa south to Ghana and Kenya, southern Spain, southern Greece, Cyprus, southern Turkey, Syria, Yemen, Iran, Transcaspia (Kazakhstan, Uzbekistan, Turkmenistan, and Tajikistan), northwest India.

RECORDS.— ALGERIA: Bou Hanifia (5 ♂, CU), Laghouat (de Beaumont, 1950a), Selfana = Zelfana (1 ♂, FSAG), Tassili des Ajjer: Oued Oukrima (de Beaumont, 1958). Also: Méla (1 ♂, FSAG), a locality of unknown location. **BURKINA FASO**: Pala near Bobo Dioulasso (1 ♂). **CYPRUS**: Saettas (Pulawski, 1971), Yermasoyia River (1 ♀). **EGYPT**: **Al Fayyum**: Karanis (2 ♀, 5 ♂), Kom Osheim (3 ♀, 4 ♂). **Al Jizah** (= Ghiza): Abu Rawash (6 ♂), Dahshur (Pulawski, 1971), Ghiza (8 ♀, 21 ♂), Saqqara (2 ♂). **Al Qahirah** (= Cairo): Gebel Asfar and Helwan (de Beaumont, 1940), Maadi (3 ♀, 8 ♂). **Al-Uqsur** (= Luxor): near Medinet Habu temple 3 km W Luxor (1 ♀). **Al-Wadi al-Jadid**: Dakhla oasis: Ewina (2 ♂, ZMAN), Mauwhoop (1 ♀, ZMAN), Mut (6 ♀, 19, ♂, ZMAN); Kharga oasis (de Beaumont, 1940); Siwa oasis (de Beaumont, 1950a): Khamissa, Sitra. **As Suways** (= Suez): Fayed (1 ♂), 10 km N Suez at 30°03′N 32°34′E (5 ♂, CSE). **Aswan**: Aswan (1 ♂), Edfu (2 ♂), near Kom Ombo temple (3 ♀, 8 ♂), 12 km S Kom Ombo in Nile valley (1 ♂, OÖLM). **Sina** (= Sinai): Abu Rudeis at 28°54′N 33°11′E (1 ♂, CSE), Ain Hudra at 28°55′N 34°33′E (2 ♂, CSE), Tor (Kohl, 1884), Wadi Gharandal 30 km NW Abu Zenima (1 ♀), Wadi Sudr 50 air km SE Suez (1 ♀, 5 ♂; 1 ♂, MSNT). **ETHIOPIA**: Moullou in southern Harerge (1 ♀, MNHN). **GAMBIA**: 1 km S Kartung (1 ♂, ZMLU). **GHANA**: Kawampe 45 km N Kintampo at 8°30′N 1°35′W (1 ♀, 6 ♂). **GREECE**: **Aegean Islands**: Rhodes: Fanes (1 ♂), Ixia (1 ♂), Kamiros (Pulawski, 1971), Kos: Kardamona (1 ♀, 1 ♂, SCHL). **Attica**: Aiyina (1 ♀, NHMW, lectotype of *schmiedeknechti*). **Ionian Islands**: Zakinthos (1 ♂). **Pelopónnisos**: Messenia: Finikous (1 ♂), Pyrgos (de Beaumont, 1965). **Sterea Ellás** (= Central Greece): Legrena (Pulawski, 1971). **INDIA**: **Gujarat**: Deesa (1 ♀, BMNH, lectotype of *heliophilus*). **IRAN** (Pulawski, 1971): **Baluchestan va Sistan**: Benduk, Neizar. **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973): Bat Yam, Elat, Haifa; also: 8 km NNE Ashkelon (1 ♂, CSE), 32 km SE Beersheba = 5 km E Yeroham (1 ♂, CSE), En Aqev near Sede Boker at 30°50.01′N 34°48.64′E (1 ♂, CSE), Iddan in Arava Valley (1 ♂), Nakhal Mangan (wadi) about 2 km N Elifaz in Negev Desert (1 ♀, UCD), Nasholim Beach 22 km S Haifa (1 ♂, CSE), Qetura Kibbutz in Arava Valley (3 ♂, UCD), Ramon Crater in Negev Desert (1 ♂, UCD), wadi near Saw Mill, Shizav Nature Reserve near Hazeva (1 ♀, CSE). **JORDAN**: Aqaba and 15 km S Aqaba (Guichard, 1991),

Wadi Rum at 29°34.20′N 35°24.30′E (1 ♂, RMNH). **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: 2 km S and 30 km SW Irghiz (K). **Almaty**: Aidarly on Ili River (1 ♂, OÖLM), Dubun on Ili river at approximately 43.5°N 80°E (K), Kapchagai (K), 35 km NW Kapchagai (K), 11 km S Panfilov, now Zharkent (K), Urpek in lower Ili River valley (P). **East Kazakhstan**: 12 km SW Buran (1 ♀), 10 km NE and 20 km E Karatal (K), Rozhkovo at about 47.5°N 85.5°E (K), Zaysan (K). **Mangghystaū**: Sozdy 135 km ESE Tauchik (2 ♂). **Qostanay**: Zhalanash (K). **Qyzylorda**: Baigakum near Chiili (P), Djulek, now Chiili (1 ♀), Zhalanash 50 km WSW Aral'sk (K). **South Kazakhstan**: 5–8 km SW Chardara (1 ♂), Khumsan (P), Koksu at approximately 42°N 70°E (K). **Zhambyl**: 30 km SW Chu (K), 50–70 km NW Furmanovka (K). **KENYA**: **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♂). **LIBYA**: **Fezzan** (Pulawski, 1971): Mendil, Mourzouk. **Tripolitania** (de Beaumont, 1956a, 1960b): Gargaresc, Garian, Giosc, Leptis Magna, Tagiura, Zuara. **MAURITANIA**: Fdérik (de Beaumont, 1952), Toungat (1 ♂; 2 ♂, FB). **MOROCCO** (de Beaumont, 1955, or as indicated): Errachida (2 ♂), 1 km E Essaouira at 31°30′N 9°44′W (2 ♀, S. Blank via CSE), Goulimine, Goulmina (1 ♂), Ksar es Souk, Marrakech, Tafraout, Tinerhir (1 ♂), Tiznit, 30 km NW (1 ♀, CSE) and 34 km SE Zagora in Draa Valley (1 ♂, CSE). **NIGER**: Gaya (1 ♀, KMG), Say (2 ♂; 4 ♂, KMG). **NIGERIA**: Azare in SE Kano (1 ♀, 1 ♂, BMNH). **OMAN** (Guichard, 1980): Rostaq, Ruwi, Samail gap. Also: Al Bagriya at 23°32.3′N 58°31.3′E (1 ♀, 16 ♂; 4 ♂, NHMO; 1 ♂, STUTTGART), Hail al Ghaf at 23°09.7′N 58°55.5′E (1 ♀), Wadi Ghul near Nizwa at 22°53.0′N 57°31.2′E (1 ♂), Wahiba Sands 11 km S Al Qabil at 22°31.0′N 58°41.2′E (4 ♂). **SAUDI ARABIA**: Al Ha'ir (1 ♂, KMG), Khumrah S Jeddah (1 ♀, OHL). **SENEGAL**: Dakar (1 ♀; 2 ♀, 17 ♂, FB), Kayar (1 ♂, FB), Ndangane 45 air km SE Mbour (1 ♀, 4 ♂, FB), Toubacouta (6 ♂, FB; 2 ♂, MSNT). **SPAIN**: **Córdoba**: Fuenteovejuna in Sierra Morena (Gayubo and Mingo, 1988). **SYRIA**: Ramadan near Damascus (1 ♂). **TAJIKISTAN**: Dushanbe (1 ♀, 1 ♂), Kabadian (1 ♂), Kondara 35 km N Dushanbe (Pulawski, 1971). **TOGO**: 5 km W Sokodé (1 ♀). **TUNISIA**: Chott el Djerid 5 km N El Fauar at 33°26′N 8°41′E (1 ♀, CSE), Nefta (3 ♂; 1 ♀, CSE), 15 km W Nefta at 33°50′N 7°43′E (2 ♂, CSE). **TURKEY**: **Mersin**: Alata near Mersin (1 ♂). **TURKMENISTAN** (Pulawski, 1971, or as indicated): Akibay in lower Murgab valley (Myartseva, 1965), Charjow (Myartseva, 1972a), Farab, Hasan-Kuli (Myartseva, 1972a), Karabekaul, Kerki, Repetek, Sandykachi (1 ♂, OÖLM), Takhta Bazar, Tedjen (4 ♀, 3 ♂). **UNITED ARAB EMIRATES**: **Dubai**: Nakhali (1 ♀, UCD). **UZBEKISTAN** (Pulawski, 1971): Aman Kutan 30 km W Samarkand, Burguchi 190 km NNW Termez, Kara-Djuzgun sands on e. shore of Lake Aral, Kara-Kul ca 50 km SE Bukhara. **YEMEN**: Aden (Bingham, 1898).

Tachysphex schoenlandi Cameron

Figures 344, 345.

Tachysphex schoenlandi Cameron, 1905:211, ♂ (as *Schönlandi*, incorrect original capitalization and diacritic mark). Holotype or syntypes: ♂, South Africa: Eastern Cape Province: Grahamstown (AMG according to original description, currently TMP), examined.— Arnold, 1923:167 (is a variety of *panzeri*, type lost), 169 (suspected synonymy with *Tachysphex panzeri* var. *aethiopicus*), 175 (listed, original description copied), 1924:68 (good species, description of ♀, South Africa), 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:276 (listed); Gess, 1981:20 (South Africa, nesting site and prey); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Recognition.— *Tachysphex schoenlandi*, a southern African species, has the apical depression of sternum I bisected by a longitudinal, obtuse carina (as in Fig. 132a); propodeal posterior surface with broad shallow impression in the dorsal third or so (rather than a well-defined sulcus); apical female tarsomeres, on mid- and hindlegs, with two or three spines near midlength of each lateral margin; and male sternum II with conspicuous setae (see below for details). In most specimens, the anal end of hindwing vein cu-a is further away from the wing base than the cubital end (as in the other species related to *erythropus*), but it is vertical or nearly so in some specimens.

In the female of *schoenlandi*, the gaster is red basally, whereas it is all black in similar species that occur sympatrically: *costae*, *detritus*, and *sericeus* (the gaster is red basally in many *costae* in the northern hemisphere). Also, the setae of *schoenlandi* are straight on the postocellar area and in the vast majority of specimens on the thorax anteriorly (sinuous in the females of *detritus* and

sericeus). In addition, the mesopleural punctures of *schoenlandi* are inconspicuous, ill defined, and the clypeal lip and labrum of many specimens are arcuate or shallowly, inconspicuously emarginate mesally. In *costae*, the labrum and clypeal lip each has a well-defined notch, and mesopleural punctures are well defined in southern African populations. Unlike *osiris*, the frons of *schoenlandi* is not gibbose, the setae are erect rather than appressed on the postocellar area, and the scutal and mesopleural setae do not conceal the integument.

The male has a conspicuous, setal fringe on the apical depression of sternum II in addition to fringes of sterna III–VI (Figs. 344c-e). *Tachysphex luctuosus* is similar, but in *schoenlandi* the labrum is flat, not protruding or only minimally protruding beyond the clypeal free margin; the galea is shorter than wide; setae of postocellar area are erect; the mesopleuron is dull, microsculptured, with ill-defined punctures; hindwing crossvein cu-a, in most specimens, has the anal end further away from the wing base than the cubital end; the forefemoral notch has a basal tuft of setae; and the forebasitarsus has 3–5 spines on the outer margin. In *luctuosus*, the labrum is slightly convex and somewhat protruding from beneath the clypeus; the galea is longer than wide; setae of postocellar area are appressed; the mesopleuron is shiny, with well-defined punctures; both ends of hindwing crossvein cu-a are equidistant from the wing base; the forefemoral notch has no basal tuft of setae and the forebasitarsus has no preapical spines on the outer margin.

Description.— Gena unusually narrow in dorsal view. Scutal punctures averaging from about

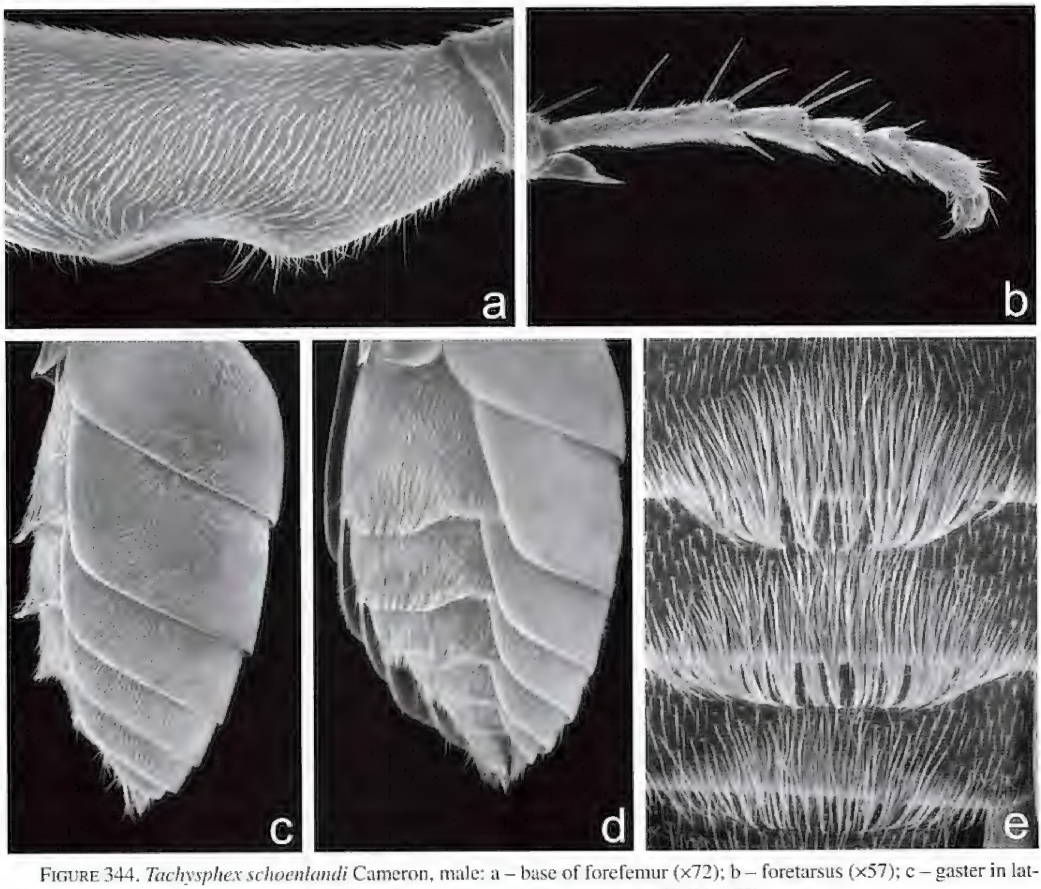


Figure 344. *Tachysphex schoenlandi* Cameron, male: a – base of forefemur (×72); b – foretarsus (×57); c – gaster in lateral view (×33); d – gaster in lateral oblique view (×33); e – fringes of sterna II–IV (×72).

one to several diameters apart on disk. Mesopleuron dull, markedly microsculptured, with shallow, ill-defined punctures. Propodeal dorsum longitudinally ridged or with ridges partly or totally reduced (then uniformly microareolate); propodeal ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end further away from wing base than cubital end) in most specimens, but vertical in some. Hindcoxal dorsum with inner margin carinate basally, carina not expanded. Sternum I with apical depression that is bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae appressed on scape; subappressed to suberect on interocellar area; straight, erect on postocellar area (about 0.3 of basal mandibular width); straight or angled apically on forecoxa, on each side of oral fossa next to occipital carina (about 0.5 of basal mandibular width), and in vast majority of specimens on mesopleuron anteroventrally (but sinuous in a female collected 30 km W Usakos and another from Swakop River mouth, Namibia); straight (angled apically) or sinuous on propodeal dorsum (about 0.5 of basal mandibular width).

Head and thorax black, mandible red mesally. Frontal setae silvery in females and small males, golden in large males. Wing membrane hyaline; forewing costal vein light brown, subcostal vein dark brown. Coloration of femora: see below. Tibiae and tarsi red. Gastral segments I and II red in female and many males, but gaster all black in some males. Terga I–III silvery fasciate apically.

♀.— Labrum: free margin arcuate or broadly, shallowly emarginate mesally. Clypeus bevel shorter than basomedian area; lip free margin arcuate, either entire or with median notch and two lateral incisions on each side. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.0–2.2 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two or three spines. Forebasitarsus with eight or nine rake spines. Apical mid- and hindtarsomeres with two spines at midlength of each lateral margin. Apical depression of tergum V impunctate, glabrous. Length 8.5–12.0 mm. Forefemur black except red apically; midfemur black, red apically (up to distal half); hindfemur all red or basal two thirds black.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel rudimentary; lip free margin arcuate or slightly sinuate, with ill-defined corner; distance between corners 1.3–1.5 × distance between corner and orbit. Width of postocellar area 0.4–0.8 × length. Dorsal length of flagellomere I 1.9–2.3 × apical width. Forefemoral notch glabrous, with basal tuft of setae (Fig. 344a). Outer margin of forebasitarsus with 3–5 rake spines; outer apical spine of foretarsomere II longer than tarsomere III (Fig. 344b). Sterna II–VI, on apical depressions, each with conspicuous fringe of dense, as if agglutinated setae (Figs. 344c-e), setae markedly longer than on remaining surface. Length 6.0–10.0 mm. Volsella and penis valve as in *costae* (see Fig. 102). Femora black except red apically (up to about one third on hindfemur).

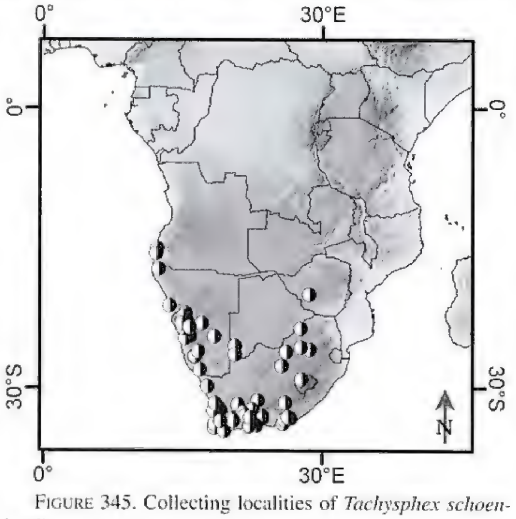


FIGURE 345. Collecting localities of *Tachysphex schoenlandi*.

HABITAT AND PREY.— *Tachysphex schoenlandi* nests in friable soils and preys upon nymphal mantids (Gess, 1981).

GEOGRAPHIC DISTRIBUTION (Fig. 345).— Southern Africa north to Angola and Zimbabwe.

Records.— **ANGOLA**: Giraul River 10 mi NE Namibe (1 ♂, BMNH), 25 mi S Namibe (1 ♂, BMNH). **LESOTHO**: Mamathes (3 ♀; 12 ♀, 14 ♂, AMG; 4 ♂, CU). **NAMIBIA**: **Karibib District**: 55 km SW Usakos (1 ♂), 65 km SW Usakos (1 ♀, 1 ♂, MS), 30 km W Usakos (1 ♀, AMG), **Lüderitz District**: Aus (1 ♂), near Aus on road to Helmeringhausen (1 ♂, AMG), Namib Farm 70 km N Aus (1 ♂, OHL), 16 km S Rosh Pinah (1 ♀, 2 ♂, AMG), locality name illegible (1 ♀, NMN). **Maltahöhe District**: Sesriem Farm (3 ♂, BMNH). **Mariental District**: 20 km S Stampriet (1 ♂, FSCA). **Opuwo District**: Otjinhungwa (2 ♂, NMN). **Rehoboth District**: 23 km N Rehoboth (2 ♂). **Swakopmund District**: Ganab (2 ♀, PPRI), Gobabeb (1 ♀, 9 ♂, PPRI; 3 ♀, 3 ♂, ZMUC), 20 km NW Gobabeb (2 ♂, FSCA), Homeb ESE Gobabeb (1 ♂, FSCA; 2 ♂, ZMUC), Middle Tinkas in Namib Naukluft Park at 22°51′18″S 15°28′28″E (1 ♂, CSE), Namib Desert Research Station (1 ♀, USU), Sossusvlei (1 ♂, BMNH), Swakopmund (1 ♂, AMG; 1 ♂, BMNH; 1 ♀, 4 ♂, JG; 6 ♂, MS; 1 ♂, ZMUC), 10 km E Swakopmund (7 ♂; 8 ♂, MS), 15 km E Swakopmund (1 ♀, 6 ♂, MS), 33 km from Swakopmund on road to Usakos (1 ♀, 1 ♂, AMG), 40 km E Swakopomund (1 ♂, ZMUC), 63 km NE Swakopmund (2 ♂), Swakop River mouth (2 ♀, 8 ♂; 4 ♂, NMN), Ugab River mouth (1 ♂, AMG), Vogelfederberg ca 55 km N Gobabeb (1 ♂, FSCA). **Walvis Bay District**: Rooibank (1 ♀, 2 ♂, AMG; 7 ♂, ZMUC), Walvis Bay (1 ♂; 3 ♂, MS). **Windhoek District**: Gaub River bed at 23°29′S 15°46′E (1 ♀, AMG). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (3 ♂, TMP), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (1 ♀, AMG), Grahamstown (1 ♂, TMP, holotype of *schoenlandi*), 18 km WNW Grahamstown: Hilton Farm (3 ♀, 5 ♂; 11 ♀, 33 ♂, AMG), Middelburg (1 ♂, SAM), Paterson (1 ♂, FSCA), Penn Rock 9 km NNE Grahamstown (1 ♂, TMP, as Penrock), Vlakwater 27 air km NW Grahmstown (1 ♂, AMG), Willowmore (1 ♂, AMG; 1 ♀, 3 ♂, TMP), 9 km E Willowmore (1 ♀, 11 ♂), 43 km NE Willowmore at 32°59′S 23°34′E (2 ♂). **Free State**: Sandveld Nature Reserve ca 5 air km E Bloemhof at 27°40′S 25°41′E (1 ♀). **Gauteng**: Bronkhorstbaai (1 ♀, AMG). **Kwazulu-Natal**: Tembe Elephant Park (4 ♀, 1 ♂, OÖLM). **Northern Cape Province**: Buffel River bed SW Springbok (1 ♀, OÖLM), Gideonsfontein W Frasserburg at 31°47′S 20°57′E (1 ♂, PPRI), Nossob in Kalahari Gemsbok National Park (1 ♂, FSCA; 1 ♀, PPRI), Twee Rivieren in Kalahari Gemsbok National Park at 26°28′S 20°37′E (1 ♀, PPRI), Victoria West (2 ♀, AMG). **Northern Province**: Ellisras (1 ♀, 1 ♂, AMG). **North-West Province**: 5 km S Brits (1 ♀, OÖLM), Lichtenburg (1 ♂, TMP). **Western Cape Province**: Bainskloof (1 ♂, FSCA), Barrydale (1 ♂, OÖLM), Beaufort West (1 ♀, SAM), Cape of Good Hope Nature Reserve (1 ♀, USNM), Cape Town including Milnerton (1 ♂, BMNH; 2 ♀, 10 ♂, USNM), Ceres (1 ♂, BMNH; 2 ♂, SAM), 43 km ENE Ceres (1 ♂, AMG), 20 km N Citrusdal (1 ♀, OÖLM), Clanwilliam (3 ♂, FSCA), 18 km S Clanwilliam at 32°17′S 18°56′E (1 ♂, AMNH), Dasklippas in Cederberg Mts. NE Porterville (2 ♂, OHL), Goukamma at 34°02′S 22°57′E (1 ♂, NMN), Konstabel Farm 30 km WSW Matjiesfontein (1 ♂), 5 km S Lambert's Bay (1 ♂, OÖLM), 40 km S Lambert's Bay (2 ♀, 3 ♂, OÖLM), Merweville (6 ♂, SAM), Mossel Bay (3 ♂, BMNH), Mossel Bay: Great Brak River (1 ♂, SAM), Pearly Beach (1 ♀, 1 ♂, SAM), Prince Albert Road (1 ♀, BMNH), Tierberg Farm 23 km NE Prince Albert (2 ♂), 18 mi E Touwsrivier to Hondewater (1 ♂, SAM), Vredendal (1 ♂, AMNH), Wellington: Rooshoek (1 ♀, 2 ♂, RMNH). **ZIMBABWE**: Bulawayo airport (6 ♀, 10 ♂; 1 ♀, 2 ♂, NHMZ), Ntabanende (1 ♀, AMG).

Tachysphex scopa Pulawski, sp. nov.

Figures 346–349.

Derivation of name.— *Scopa*, Latin for brush, a noun in apposition to the generic name. An allusion to the unique, brush-like vestiture of the male sterna.

Recognition.— The female of *scopa* resembles *harpax* and *rapax* in having conspicuously modified tarsi (Figs. 346c-f): tarsomeres III short (e.g., length of midtarsomere III 1.2–1.3 × apical width); mid- and hindtarsomeres IV with the dorsoapical emargination rounded proximally rather than angulate; the apical tarsomeres and claws contrastingly elongate (length of arolium about one third that of claw); the apical tarsomeres with several basoventral spines, a cluster of subapical spines on venter, one to several spines on each lateral margin, and the apicoventral margin of each tarsomere V produced into a lobe (Fig. 346f). In addition, the setae of the labrum free margin are short, thick (as in Fig. 178c), and forefemoral venter has many small punctures. A narrow clypeal

lobe of *scopa* differentiates it from both *harpax* and *rapax*: the lip corners is equidistant from each other and antennal socket rather than further apart from each other (Fig. 346a). Unlike *harpax*, the female of *scopa* has sinuous, conspicuously erect setae on the gena, most of the thorax, and on the fore- and midfemoral venters (in *harpax*, the mesothoracic and femoral setae are straight, short, appressed). Unlike *rapax*, the gaster of *scopa* is all red or at least red basally (rather than black with reddish apex), and the propodeal side is ridged (rather than uniformly microsculptured).

The male of *scopa* is unique in having dense, suberect setae that cover sterna II–VI almost margin to margin (Figs. 347b-d). Subsidiary recognition features are: setae sinuous and erect on the gena, most of the thorax, and the fore- and midfemoral venters; outer margin of the forebasitarsus with at least three rake spines and the apical spine of foretarsomere II no longer than foretarsomere III; and venters of apical mid- and hindtarsomeres each with a central cluster of small spines (Fig. 347a).

Description.— Labrum: free margin with short, stout setae (as in Fig. 178c). Galea longer than wide in profile, as long as 0.7 of scape, sparsely punctate (interspaces shiny). Punctures well defined on scutal disk, averaging 2–3 diameters apart; on mesopleuron minute, at least 2–3 diameters apart; on mesothoracic venter several diameters apart. Propodeal dorsum longitudinally ridged, side ridged. Hindcoxal dorsum with inner margin carinate basally, carina not expanded.

Setae concealing integument on frons; sinuous on gena, scutum anteriorly, mesopleuron, propodeal dorsum, and venters of fore- and midfemora; erect on lower gena and on scutum anteriorly (length 0.6–0.7 and about 0.5–0.6 × basal mandibular width, respectively); appressed or nearly so on postocellar area; erect or slightly inclined anterad on propodeal dorsum.

Head and thorax black, but mandible (except apically) yellowish reddish and the following reddish in male: clypeal bevel and lip, labrum, and scapal venter; also clypeal lip reddish in many females. Frontal setae silvery in female, golden in male. Wing membrane hyaline; forewing costal vein light brown, subcostal vein brown. Femora black in female (except apically), mostly red in male but fore- and midfemora black basodorsally; tibiae and tarsi red. Gaster all red, but segments III–VI black in a female from Dikbome Farm, South Africa. Terga I–IV silvery fasciate apically (fasciae inconspicuous in female).

♀.— Clypeus (Fig. 346a): bevel markedly longer than basomedian area; lip free margin arcuate, not incised laterally; lip corners equidistant from each other and antennal socket. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.6–2.9 × apical width. Forefemoral venter minutely punctate, punctures several diameters apart. Dorsal foretibial surface with one or two spines; outer surface with narrow asetose zone and three long bristles. Forebasitarsus with nine or ten rake spines. Mid- and hindtrochanteral venters shiny, punctures several diameters apart. Length of tarsomeres III, on fore-, mid, and, hindlegs, about 1.2, 1.2–1.3, and about 1.4 × apical width, respectively. Tarsomeres IV: length about equal to apical width, dorsoapical emargination rounded proximally, apicoventral margin markedly concave (Fig. 346d). Apical tarsomeres markedly elongate, with several basal spines and cluster of subapical spines on venter, apicoventral margin produced into lobe; and each lateral margin with one to several spines near midlength (Figs. 346c, e, f). Claws elongate, arolium about one third of claw length (Fig. 346e). Apical depression of tergum V impunctate, glabrous. Length 7.1–9.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 346b): bevel not sharply delimited from basomedian area, about as long as the latter or markedly longer; lip free margin arcuate, not emarginate mesally, corner somewhat ill defined; distance between corners 0.6–0.7 × distance between corner and orbit. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.2–2.4 × apical width. Forefemoral notch small (microscopically setose) or absent. Outer margin of forebasitarsus with 3–6 rake spines; outer apical spine of foretarsomere

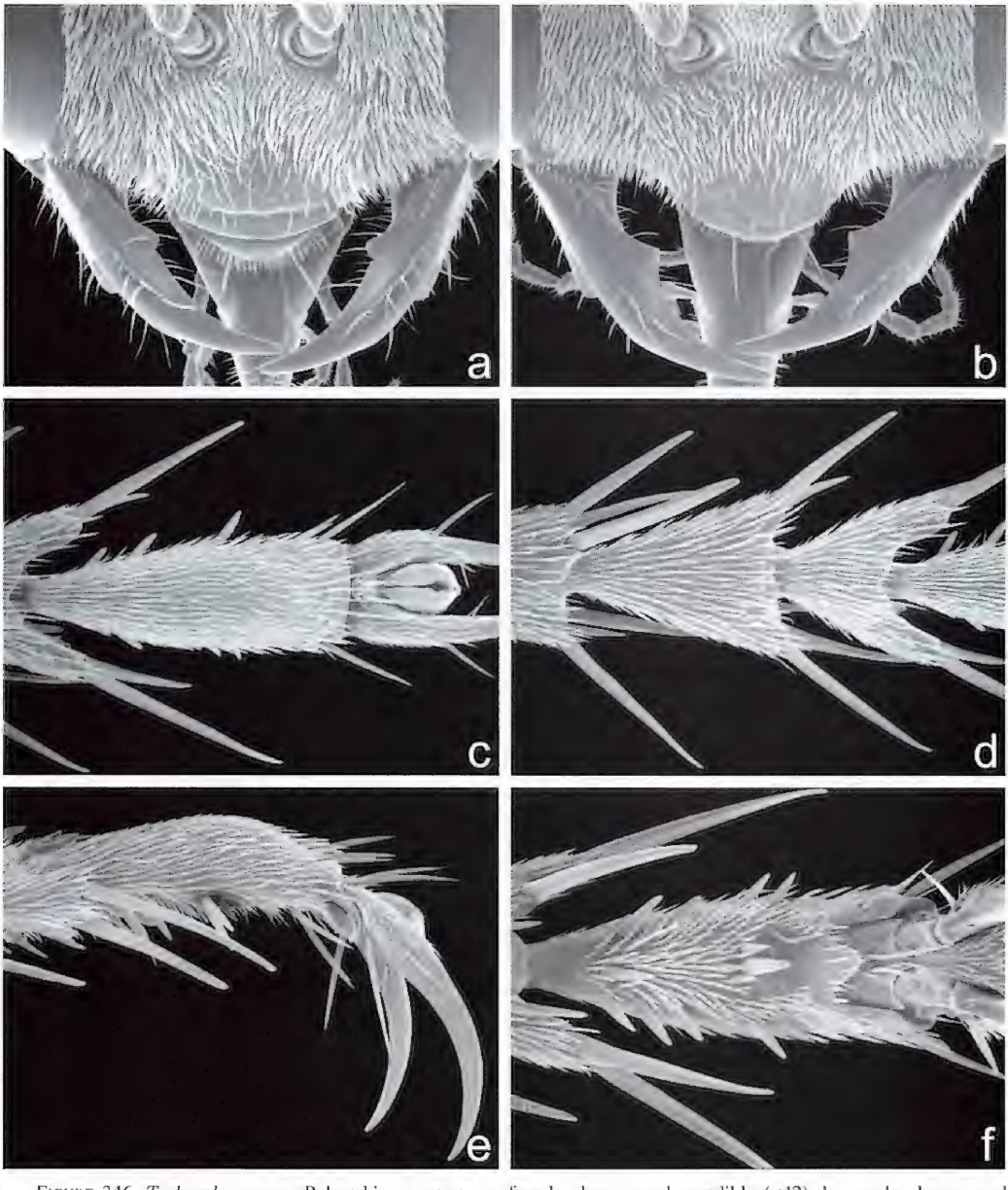


FIGURE 346. *Tachysphex scopa* Pulawski, sp. nov.: a – female clypeus and mandible (×42); b – male clypeus and mandible (×56); c – female hindtarsomere V in dorsal view (×90); d – female hindtarsomeres III and IV in dorsal view (×90); e – female hindtarsomere V in lateral view (×90); f – female hindtarsomere V in ventral view (×90).

II as long as tarsomere III or slightly shorter. Apical mid- and hindtarsomeres each with central cluster of two or three small spines on venter (Fig. 347a). Sternum II (except basally) and sterna III–VI with conspicuous dense, suberect setae that extend almost margin to margin (Figs. 347b-d). Apical margin of sternum VIII roundly prominent mesally. Volsella and penis valve: Fig. 348. Length 6.5–8.2 mm.

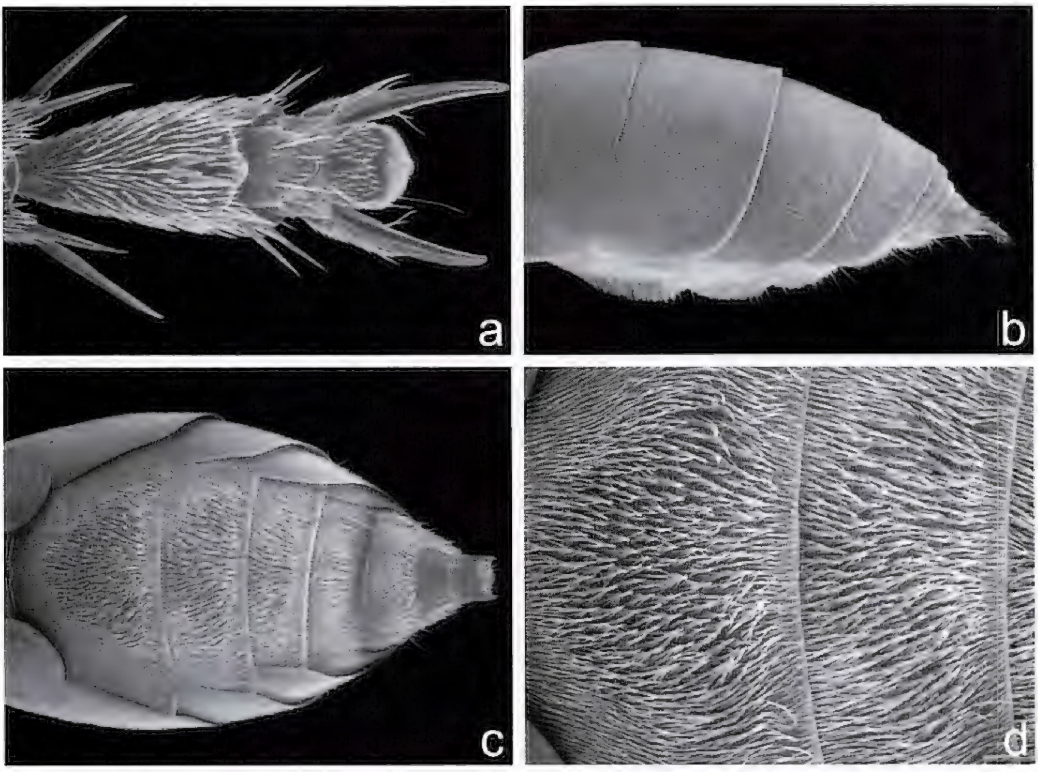


FIGURE 347. *Tachysphex scopa* Pulawski, sp. nov., male: a – hindtarsomere V ventrally (×90); b – gaster in lateral view (×30); c – gaster in ventral view (×30); d – sterna II and III showing vestiture (×72).

FLORAL RECORD.— Specimens of this species were collected on flowers of *Welwitschia mirabilis* J.D. Hooker (those from Homeb area, Namibia) and of *Zygophyllum simplex* L. (those from 30 km E Karasburg, from the road to Uis Myn, and 93 km from Swakopumund on the road to Usakos, all Namibia), as recorded by F.W. and S.K. Gess, the collectors.

GEOGRAPHIIC DISTRIBUTION (Fig. 349).— Angola, Namibia, western South Africa.

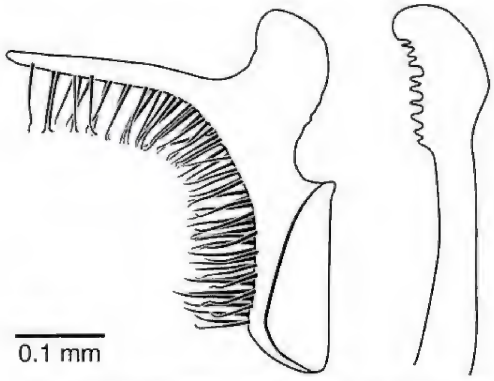


FIGURE 348. *Tachysphex scopa* Pulawski, sp. nov.: volsella and penis valve.

RECORDS.— HOLOTYPE: ♂, **NAMIBIA**: **Karibib District**: 65 km SW Usakos, 1 Mar 1990, WJP (CAS). PARATYPES: **ANGOLA**: Giraul River 10 mi NE Namibe, 27–29 Feb 1972, [British Museum] Southern African Expedition (1 ♂, BMNH). **NAMIBIA**: **Karasburg District**: 52 km N Grünau, 2 Feb 1982, L. Stange and R.B. Miller (1 ♂, FSCA); 30 km E Karasburg, 12 Mar 1997, FSG (1 ♀, 1 ♂, AMG). **Karibib District**: 97 km from Swakopmund on road to Usakos, 16 Mar 2000, FSG (3 ♀, 15 ♂, AMG), 65 km SW Usakos, 1 Mar 1990, MS (1 ♀, MS). **Khorixas District**: Uis, Feb 1978, C. Kok and S.J. van Tonder (1 ♀, 3 ♂, PPRI); 94 km from coast on road to Uis Myn, 17 Mar 2000, FSG (2 ♂, AMG); 120 km from coast on road to Uis Myn at 21°14′S 14°51′E, 17 Mar 2000, FSG (1 ♀, 1 ♂, AMG). **Mariental District**: 65 km S Mariental,

13 Feb 1990, WJP (1 ♂). **Rehoboth District**: 15 km N Kalkrand, 13 Feb 1990, WJP (1 ♂). **Swakopmund District**: NW Cape Cross at 21°44′S 13°59′E, 14 Mar 1999, FSG (1 ♂, AMG); 20 km NE Henties-baai, 10 Dec 1996, WJP (2 ♂); Kuiseb River near Gobabeb, 18 Feb–20 Mar 1983, National Collection Kuiseb Survey (2 ♀, PPRI); Namib Desert at 23°38′S 15°41′E, Marsh, 18 Apr 1982 (1 ♀, PPRI) and 18 Dec 1982 (1 ♂, PPRI); Namib Naukluft Park N Homeb at 23°38′S 15°13′E, CDE (2 ♂, PPRI); 63 km NE Swakopmund, WJP, 15 Feb 1996 (8 ♀, 25 ♂), 19 Feb 1996 (17 ♀, 19 ♂), 5 Mar 1996 (10 ♀, 21 ♂), 5 Dec 1996 (5 ♂), 9 Dec 1996 (3 ♂); Swakop River at 22°41′S 14°35′E, 11 Apr 1998, FSG (1 ♂, AMG). **SOUTH AFRICA**: **Western Cape Province**: Beaufort West District, Feb 1958, [South African] Mus. Staff (1 ♂, SAM); Dikbome Farm on Merweville-Koup road, Jan 1953, H. Zinn (4 ♀, 2 ♂, SAM); Merweville in Laingsburg District, Jan 1959, H. Zinn (1 ♂, SAM); Merweville District [*sic*], Jan-Feb 1947, H. Zinn (1 ♀, SAM); Prince Albert Road, 27 Dec 1973, P.M.F. Verhoeff (1 ♂, RMNH); Tierberg Farm 23 km NE Prince Albert, WJP, 21–22 Jan 1996 (15 ♂), 30–31 Jan 1996 (2 ♀, 12 ♂), 27 Dec 1996 (1 ♂).

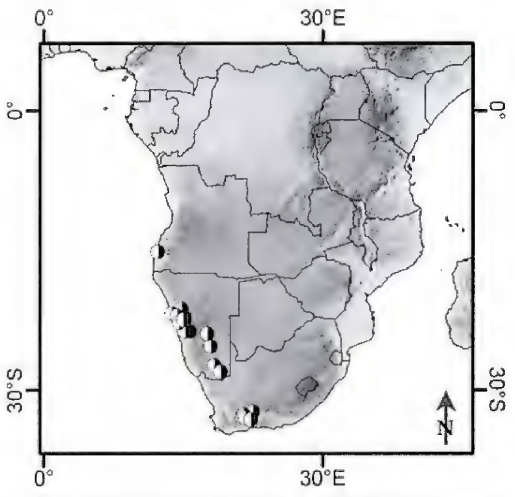


FIGURE 349. Collecting localities of *Tachysphex scopa*.

Tachysphex sericeus (F. Smith)

Figures 350–352.

Larrada sericea F. Smith, 1856:285, ♀. Holotype or syntypes: ♀, Gambia: no specific locality (BMNH), examined.— Nec *Tachytes sericeus* of De Stefani Perez, 1886:171 and 1895:226 (= *Tachysphex erythropus*).— As *Larra sericea*: Dalla Torre, 1987:674 (new combination, in catalog of world Hymenoptera).— As *Tachysphex sericeus*: R. Turner, 1917c:197 (new combination, synonymy); Arnold, 1923:154 (in revision *of* southern African *Tachysphex*), 1930:3 (in checklist of Afrotropical Sphecidae); Guiglia, 1943b:76 (Ethiopia), 1950:249 (Ethiopia); Pulawski, 1975:313 (synonymy); Bohart and Menke, 1976:276 (listed); Gess, 1981:20 (nesting in friable soils); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Lyrops fluctuata Gerstaecker *in* Peters, 1858:510, ♀ (authorship attributed to Klug). Holotype: ♀, Mozambique: Tette (ZMHU), examined. Synonymized with *Tachysphex sericeus* by R. Turner, 1917c:197, synonymy confirmed by Pulawski, 1975:313.— Kohl, 1883b:226 (incorrectly synonymized *fluctuatus* with *erythropus*).— As *Tachytes fluctuatus*: nec Magretti, 1884:587 (= *Tachysphex vulneratus*), Magretti, 1898:51 (Somalia).— As *Tachysphex fluctuatus*: nec F. Morawitz, 1894:342 (= *Tachysphex sordidus*); Dalla Torre, 1897:679 (in catalog of world Hymenoptera); Stadelmann, 1897:255 (study of type, new combination); Bingham, 1898:104 (Yemen: Aden); W. Schulz, 1905:9 (West Africa); Kohl, 1906:218 (Yemen); Longstaff, 1911:195 (Sudan), 199 (Sudan); nec Ferton, 1912:399 (= *Tachysphex costae*); nec Cros, 1936:355 (= *Tachysphex costae*); nec Móczár, 1938:80 (= *Tachysphex costae*); Arnold, 1945:97 (as valid species), 1951:155 (Ethiopia, Ghana); Pulawski, 1971:416 (recognition characters).— Nec following authors (= *Tachysphex erythropus*): Kohl, 1885:367; W. Fox, 1896:554; W. Schulz, 1904:102; von Schulthess, 1909:442; Mercet, 1910:165; Morice, 1911:101; Dusmet, 1915:87; von Schulthess, 1926:215; Guiglia, 1932b:474; Gussakovskij, 1933:280; Nadig, 1933:79; Guiglia *in* Zavattari, 1934:303; Gussakovskij, 1935:426 (Tajikistan); de Beaumont, 1936b:614, 1936c:8; Rungs, 1936:24; Guiglia, 1939a:187, 1940:292, 1942:234; Honoré, 1942:56 Giner Marí, 1943:139, 1947:25; Ceballos, 1956:376; Myartseva, 1963:58.

Lyrops fluctuata Gerstaecker, 1862:478, ♀. Objective synonym of *Lyrops fluctuata* Gerstaecker, 1858.

Tachysphex selectus Nurse, 1909:514, ♂. Holotype: ♂, India: Bombay (BMNH), examined.— **Restored synonymy.** Synonymized with *Tachysphex sericeus* by R. Turner, 1917c:198.— Pulawski, 1975:313 (syn-

onymy); Bohart and Menke, 1976:276 (listed); Krombein and Pulawski, 1994:72 (in revision of Sri Lankan *Tachysphex*).

As *Tachysphex ferrugineipes* (Lepeletier): Cameron, 1908:289 (Tanzania), corrected to *Tachysphex sericeus* by R. Turner, 1917c:198.

Tachysphex actaeon de Beaumont, 1960a:16, ♀, ♂. Holotype: ♂, Israel: Jerusalem (LAUSANNE). Synonymized with *Tachysphex selectus* by Pulawski, 1975:313.— Pulawski, 1967:398 (Turkey), 1971:412 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:13 (Israel).

Species 2 (part): van Noort, Prinsloo, and Compton, 2000:348 (Namibia), **present correction**.

Recognition.— *Tachysphex sericeus* has the apical depression of sternum I intersected by a longitudinal carina (as in Fig. 132a), hindwing vein cu-a oblique (anal end further away from wing base than cubital end), at least some setae sinuous on the head and thorax, and male sternum III with setae markedly longer apically than basolaterally. This combination is shared with *detritus* and *flavofimbriatus*. In *sericeus*, however, setae of tergum I are appressed (erect on sides of basal declivity in female and many males of *detritus*) and the outer margin of the male forebasitarsus lacks preapical spines or occasionally has one or two spines next to the apical one (preapical spines present in *detritus*). Additionally, the clypeal bevel of *sericeus* is step-like in the vast majority of females (Figs. 350a, b), but evenly rounded in some, and the setae on the apical depression of sternum III appear agglutinated in many males (Fig. 351c). In *detritus*, the clypeal bevel is rounded in the vast majority of females (but step-like in some), and the setae of sternum III are not agglutinated in the male. In contrast with *flavofimbriatus*, the tibiae of *sericeus* are red except largely black

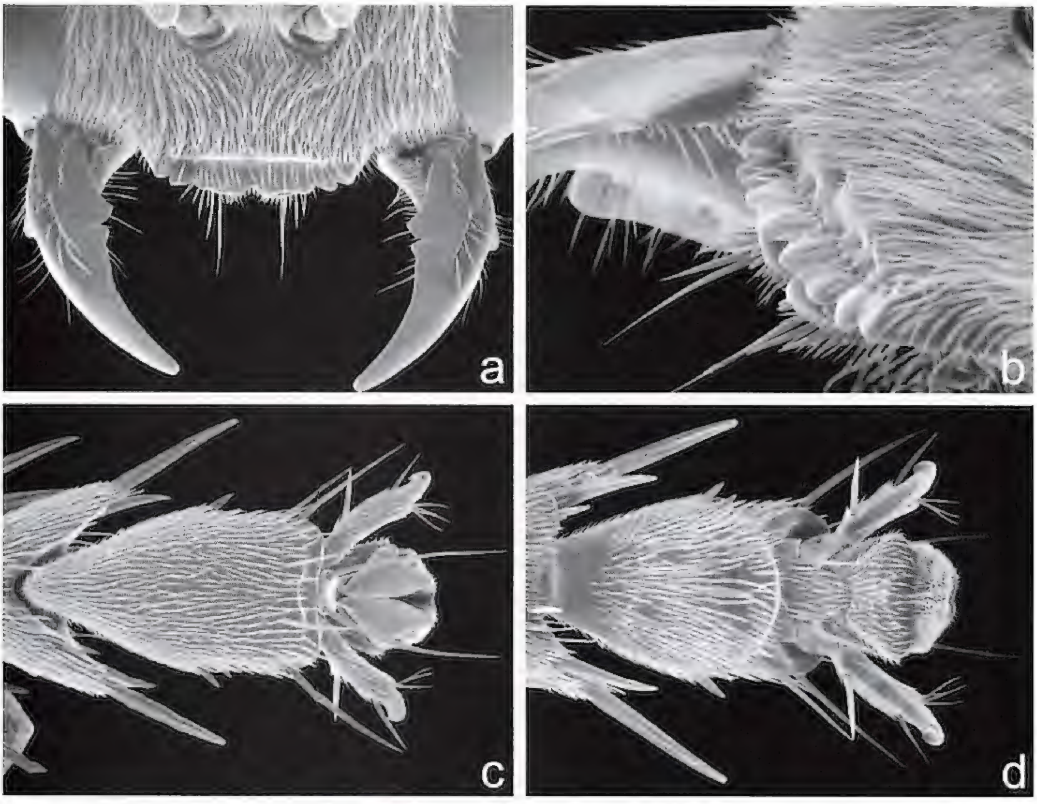


Figure 350. *Tachysphex sericeus* (F. Smith), female: a – clypeus and mandible (×28); b – clypeal lobe in lateral oblique view showing stepped bevel (×58); c – hindtarsomere V in dorsal view (×86); d – hindtarsomere V in ventral view (×93).

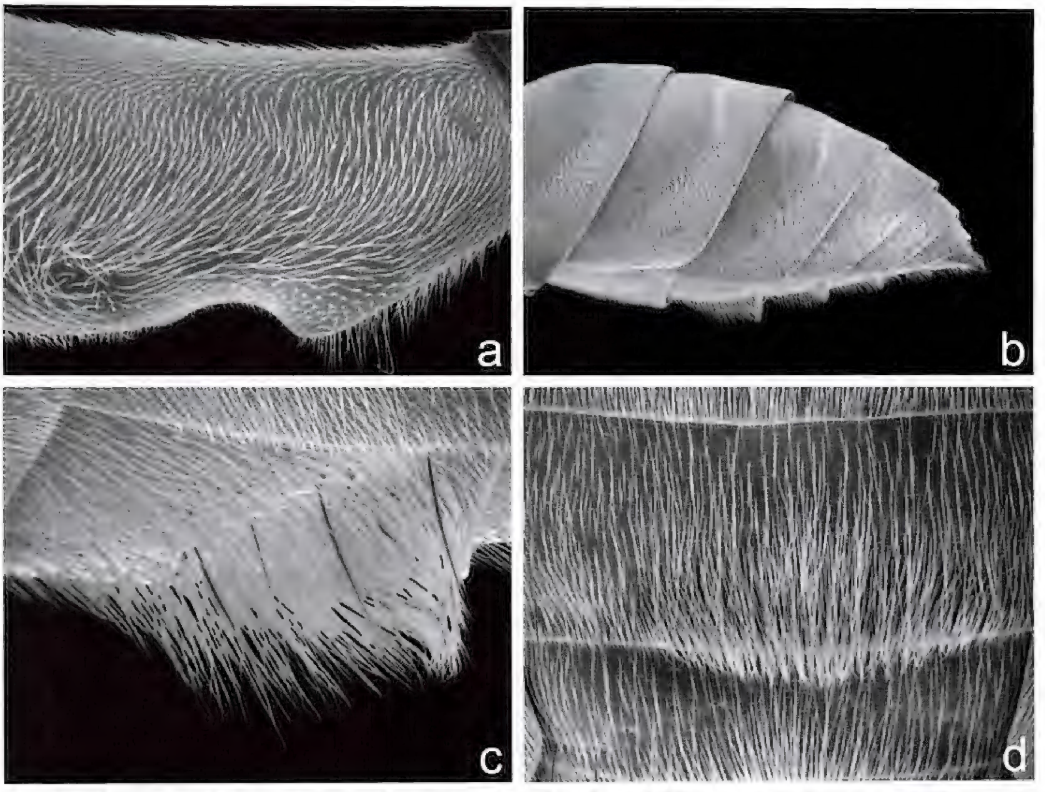


FIGURE 351. *Tachysphex sericeus* (F. Smith), male: a – base of forefemur (×90); b – gaster in lateral view (×30); c – setal fringe of sternum III in lateral view (×90); d – setal fringe of sternum III in ventral view (×60).

in exceptional specimens from the United Arab Emirates, the male forefemur is emarginate (Fig. 351a), and setae of the apical depression of sternum III are dark brown. In *flavofimbriatus* (an endemic of Madagascar), the mid- and hindtibiae are all or partly black, the male forefemur is entire, and setae of the apical depression of male sternum III are white.

JUSTIFICATION OF NEW SYNONYMY.— Turner (1917c) synonymized *selectus* with *sericeus*, but I treated them as distinct species (Pulawski *in* Krombein and Pulawski, 1994:72). I distinguished *selectus* by slightly shorter setae on the postocellar area and midfemoral venter, male forefemoral notch not compressed, and its occurrence in Asia rather than Africa (with no known contact zone). Study of additional material has convinced me that these setal and femoral differences represent geographic variation and that only one species is involved. Therefore, I agree with Turner and regard the two names as synonyms.

DESCRIPTION.— Gena unusually narrow in dorsal view except in Asian specimens. Punctures of scutal disk varying from large, about one diameter apart, to minute, several diameters apart; interspaces microsculptured, dull in most specimens, but unsculptured, shiny in a female from 62 km SW Morogoro, Tanzania. Mesopleuron dull, markedly microsculptured, with shallow, ill-defined punctures. Propodeal dorsum longitudinally ridged to irregularly rugose (ridges and rugae partly effaced in some males), intersecting posterior face at about right angle; side ridged but ridges anastomosed in many specimens and effaced in smallest ones; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a

oblique (anal end further away from wing base than cubital end), but only slightly so in some specimens from Sri Lanka. Hindcoxal dorsum with inner margin carinate basally. Sternum I with apical depression bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae erect and in most specimens sinuous on postocellar area, along hypostomal carina, on thorax, and also on fore- and midfemoral venters in some females, but sinuous only on pronotal lobe and propodeal dorsum in one female from Coimbatore, India, and on lower gena and propodeal dorsum in one female from Dakhla oasis, Egypt; in two males from Dakhla oasis, only a few setae on the lower gena are sinuous. Setal length expressed as a fraction of basal mandibular width: mostly 0.3 on postocellar area, but 0.2 or less in Asian specimens, and 0.6 in single male from Ndola, Zambia; about 0.6–0.7 on each side of oral fossa next to occipital carina, on mesopleuron anteroventrally, and on propodeal dorsum.

Head, thorax, and gaster black, mandible reddish mesally. Frontal setae silvery in most females (golden in single female from Ivory Coast), golden in male (silvery in ventral half in some specimens). Wings hyaline to slightly infumate; forewing costal vein light brown, subcostal vein dark brown. Femora all or largely red in most females, black except red apically in some; in male forefemur black (except red apically), midfemur varying from black except narrowly red apically to red in apical half, hindfemur varying from black except narrowly red apically to all red; tibiae and tarsi red. The single female from the United Arab Emirates is unusual in having mid- and hindlegs darkened, nearly black (except femoral apex narrowly reddish). Terga I–IV (I–V in most males, I–III in some) silvery fasciate apically.

♀.— Labrum with well-defined notch. Clypeus (Figs. 350a, b): bevel markedly shorter than basomedian area, step-like in vast majority of specimens (evenly convex in some); lip emarginate mesally, with two lateral incisions on each side (incisions varying from evanescent to conspicuous). Width of postocellar area 1.0–1.4 × length. Dorsal length of flagellomere I 1.8–2.3 × apical width. Dorsal foretibial surface with two or three spines; outer surface partly asetose, with three spines. Forebasitarsus with 13–15 rake spines. Apical mid- and hindtarsomeres with two or three spines at midlength of each lateral margin (Figs. 350c, d). Apical depression of tergum V impunctate, glabrous. Length 9.5–14.6 mm.

♂.— Inner mandibular margin with tooth and cleft. Clypeus: bevel markedly shorter than basomedian area; lip free margin arcuate or slightly sinuate, with well-defined corner; distance between corners about 1.2 × distance between corner and orbit. Width of postocellar area 0.3–0.6 × length. Dorsal length of flagellomere I 1.8–2.0 × width. Forefemoral notch somewhat compressed in most African males (glabrous longitudinal area crest-like in some specimens), with or without erect setae proximally (Fig. 351a, see Variation below). Outer margin of forebasitarsus without preapical spines, exceptionally with one or two such spines next to apex. Sternum II with setae as long on apical depression as on remaining surface or longer. Apical depression of sternum III with setae that are either appressed, appearing agglutinated (most specimens) or suberect and dense but not agglutinated, setae markedly longer than on remaining surface (Figs. 351b-d); apical depressions of sterna IV–VI either setose or glabrous. Length 8.0–14.2 mm. Volsella and penis valve as in *costae* (see Figs. 102b, c).

Variation.— In most specimens, including the holotypes of *sericeus* and *fluctuatus*, scutal punctures are minute, several diameters apart; the postocellar area in the female is about as wide as long; the forefemoral notch in the male has no erect setae; and the setae of the fore- and midfemoral venters are straight, nearly appressed. In many southern African and several Ethiopian specimens, scutal punctures are large, conspicuous, markedly denser (no more than one diameter apart in some females); the postocellar area in the female is wider than long; setae are erect and sinuous on the female fore- and midfemoral venters; and the male forefemoral notch has several erect setae on

proximal quarter or third. No intermediates have been found in several places where the two forms coexist (e.g., Ellisras, South Africa), but this is probably an artifact of insufficient collecting. Indeed, the differences are not always correlated, suggesting individual rather than geographic variation or presence of two species. For example, scutal punctures are minute in a female from Sawmills, Zimbabwe, but the setae are erect and sinuous on the midfemoral venter. In a male from Afguns, South Africa, scutal punctures are large but sparse, setae of the femoral notch are appressed, and those of midfemoral venter are not sinuous. In specimens from the Ivory Coast, scutal punctures are relatively large, width of the postocellar area in the female is about 1.3 × length, and setae of the female midfemoral venter are suberect and sinuous, but the male forefemoral notch has no erect setae. A male from the Usakos area, Namibia, has large scutal punctures and sinuous setae on the fore- and midfemoral venters (like many southern African females), but no erect setae on the forefemoral notch. Scutal punctures are also relatively large in Asian specimens. Setae of the forefemoral notch vary in length from well developed to almost none in males from Olifanthoek and Wellington, South Africa.

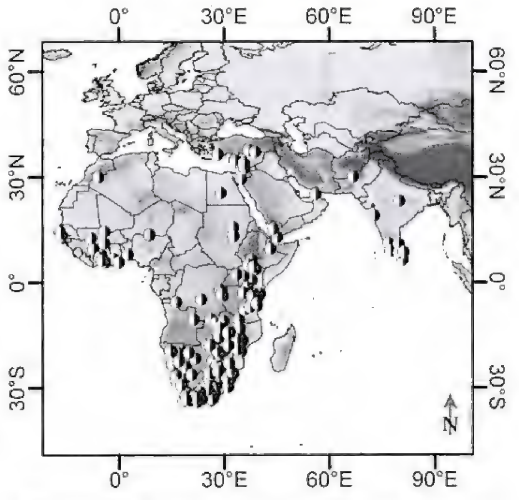


FIGURE 352. Collecting localities of *Tachysphex sericeus*.

GEOGRAPHIC DISTRIBUTION (Fig. 352).— Africa north to Ethiopia and Morocco; also Turkey, Cyprus, Rhodes, Israel, Lebanon, Jordan, Pakistan, India, Sri Lanka.

RECORDS.— ANGOLA: **Lunda**: Nova Chaves (1 ♂). **BENIN**: 15 km SW Savé (1 ♀, OÖLM). **BOTSWANA**: Kasane: Chobe Rapids (1 ♀, SAM), Mongalatsila in Ghanzi District (1 ♀, BMNH), Serowe (1 ♀). **BURKINA FASO**: Pala near Bobo Dioulasso (1 ♀). **BURUNDI**: Bururi (2 ♂, MRAC). **CYPRUS**: Polemidia (Pulawski, 1971), Yermasoyia River (1 ♂). **EGYPT**: Mut in Dakhla oasis (1 ♂; 1 ♀, 1 ♂, ZMAN). **ETHIOPIA**: **Gamo Gofa**: 58 road km NNE Arba Minch (1 ♂), Condaraba (Guiglia, 1950). **Harerge**: 44 km ENE Jijiga (1 ♀, 4 ♂; 2 ♂, AAU), Moullou (1 ♀, 1 ♂, MNHN). **Sidamo**: 22 km N Moyale (2 ♂), 26 km N Moyale (1 ♀, 2 ♂; 2 ♂, AAU), 63 km S Yabelo (2 ♂). **Location unknown**: Elolo (Guiglia, 1950) and Meisso (Arnold, 1951). **GAMBIA**: no specific locality (1 ♀, BMNH, holotype of *sericeus*). **GHANA**: Kumasi (1 ♂, BMNH), Labadi (Arnold, 1951), Legon 12 km NNE Accra (1 ♀, 2 ♂). **GREECE**: **Aegean Islands**: Rhodes: Ixia (Pulawski, 1971). **INDIA**: **Madhya Pradesh**: Jabalpur (1 ♂, BMNH). **Maharashtra**: Bombay (1 ♂, BMNH, holotype of *selectus*). **Tamil Nadu**: Coimbatore (1 ♀, 3 ♂; 1 ♀, FSAG; 1 ♀, USNM), Dohnavur in Tirunelveli (= Tinnevelly) District (1 ♀, BMNH), Karikal (1 ♂). **ISRAEL** (Pulawski, 1971, or as indicated): Dagania (= Deganya), Dalia, 5 km W Elat at 29°32′N 34°54′E (1 ♀, CSE), Jerusalem (3 ♂, including 2 paratypes of *actaeon*), Tiberias. **IVORY COAST**: 40 km N Abijan (1 ♀, MSNT), Bouaké (1 ♀, MSNT), Bouaké: Foro-foro (1 ♀, MRAC; 1 ♀, UCD), Degbezère 15 km E Bouaflé (1 ♀, 1 ♂, RMNH), Parc National de la Maraqué (1 ♀), 40 km S Toumodi (2 ♂). **JORDAN**: Irbid at 32°33′N 35°51′E (1 ♀, RMNH). **KENYA**: **Coast Province**: Malindi (3 ♀, BMNH), 20 km S Mombasa (2 ♂, CNC), Muhaka at 4°20′S 39°30′E (1 ♀), Taita Discovery Centre (1 ♀), Taita Discovery Centre: Galla Hill area (1 ♂), Voi area (1 ♀, 43 ♂, OÖLM). **Eastern Province**: 2 km S Archer's Post (1 ♂), 5 km NNE Isiolo (1 ♀, 2 ♂). **Rift Valley Province**: Archer's Post on Ewaso Ng'iro River (1 ♀), Lodwar road 4 km N road to Sigor (1 ♂), Magadi road 25 air km SW Nairobi (2 ♂), 46 air km SW Nairobi at 1°34.0′S 36°27.4′E (1 ♀, 30 ♂; 10 ♂, NMK), 51 air km SW Nairobi at 1°34.6′S 36°24.5′E (2 ♂), Marich Pass Field Studies Centre (1 ♂), Olorgesailie (8 ♂). **LEBANON**: Nahr el Kelb (Pulawski, 1971). **LESOTHO**: Leribe (1 ♂, AMG), Mamathes (5 ♀, 2 ♂ AMG). **MALAWI**: Chikawa (1 ♂, ZMAN), Chiromo (1 ♀, ZMAN), Livingstonia (1 ♀, OHL), Matumbas near Domira Bay (1 ♀,

BMNH), Nkhotakota (1 ♂, USU). **MALI**: Bamako (1 ♀, KMG), 10 km S Mopti (1 ♂). **MOROCCO**: 30 km S Zagora in Draa Valley (1 ♀, CSE). **MOZAMBIQUE**: Dondo (1 ♀, SAM), Guengère in Pungoué Valley (1 ♀, MNHN), Maputo (1 ♂, AMG), Nova Chupanga near Chemba (1 ♀, MNHN), Tengo de Soungué in Gorongoza Province (1 ♀, MNHN), Tette (1 ♀, ZMHU, holotype of *fluctuatus*). **NAMIBIA**: **Grootfontein District**: Meteorite (1 ♂, MS), 60 km SW Otavi (3 ♂, MS). **Karasburg District**: Fish River Canyon 15 km E Ai–Ais (1 ♂; 4 ♂, SDNHM), Great Karas Mts. (2 ♀, 3 ♂, SAM), 52 km N (1 ♂) and 12 km SW (1 ♂) Grünau (FSCA). **Karibib District**: Okandukaseibe Farm 47 km S Wilhelmstal (1 ♂, LACM), 55 km SW Usakos (1 ♂), 65 km SW Usakos (1 ♂, MS), 17 km W Usakos (1 ♀, MS), 30 km W Usakos (1 ♀, AMG). **Khorixas District**: Brandberg Plateau (1 ♂, SAM, determined as Species 2 by van Noort, Prinsloo, and Compton, 2000). **Lüderitz District**: Aus (1 ♀, BMNH), Chamnaub at 27°43′S 16°05′E (1 ♂, AMG), Klein-Aus-Vista at 26°41′S 16°13′E (1 ♂, AMG). **Mariental District**: 71 km E Stampriet (1 ♀, AMG). **Okahandja District**: Waldau River 17 km W Okahandja (1 ♀). **Otjiwarongo District**: 50 km ESE Otjiwarongo (1 ♂), 50 km NE Otjiwarongo (1 ♂, JG). **Outjo District**: 31 km SE Kamanjab (1 ♂; 1 ♂, MS), Kaross Farm (1 ♀, SAM). **Swakopmund District**: Ganab (6 ♂, PPRI), Gobabeb (1 ♂, PPRI), Homeb ESE Gobabeb (3 ♂, PPRI; 1 ♀, SDNHM), Kuiseb River at Gobabeb (2 ♀, PPRI; 1 ♀, ZMUC), Namib Desert Research Station at 23°33′45″S 15°02′38″E (1 ♂, CSE; 1 ♀, USU), Vogelfederberg ca 55 km N Gobabeb (2 ♀, FSCA), 88 mi E Walvis Bay (1 ♂). **Windhoek District**: 5 km S Windhoek (1 ♀, SDNHM). **NIGER**: **Zinder Region**: 37 km S Tanout at 14°38.2′N 8°42.6′E (1 ♂). **PAKISTAN**: Hazarganji Chiltan National Park 20 km SW Quetta (1 ♂). **SENEGAL**: Bayakh 48 km E Dakar (2 ♂), Ndangane 45 air km SE Mbour (1♂, FB). **SOMALIA**: Umberto (Magretti, 1898). **SOUTH AFRICA**: **Eastern Cape Province**: Aberdeen area (1 ♀, 1 ♂), Addo (1 ♂, TMP), Algoa Bay (2 ♀, TMP), Alicedale (1 ♀, AMG), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (3 ♀, AMG), Goshen near Cathcart (2 ♂, SAM), Grahamstown (2 ♀, AMG), Grahamstown at Boesmans River (1 ♂, SAM), 18 km WNW Grahamstown: Hilton Farm (5 ♀, 3 ♂, AMG), Keipoort (1 ♂, AMG), Koonap River 17 km SE Adelaide (1 ♀, 1 ♂, AMG), Resolution 17 air km NNE Grahamstown (1 ♀, 1 ♂, TMP), Strowan Farm 5 air km W Grahamstown (2 ♂, AMG), Willowmore (1 ♀, 1 ♂, TMP), 9 km E Willowmore (1 ♂), 12 km W Willowmore at 33°16′S 23°22′E (1 ♀). **Free State**: Belmont (1 ♂, BMNH), Bothaville (1 ♂, TMP), Caledon (2 ♀, 1 ♂, SCHL), Clocolan (1 ♂, AMG), Kroonstad (1 ♂, AMG). **Gauteng**: Bronkhorstbaai ca 8–9 km S Bronkhorstspruit (3 ♀, 1 ♂, AMG), Florida Hills (2 ♂, AMG), Hekpoort at 25°55′S 27°38′E (1 ♂, AMG), Johannesburg (1 ♀, 2 ♂; 1 ♂, CU), Malanskraal at 26°41′S 28°25′E (1 ♂, AMG), Mondeor Hills (1 ♂, AMG), Pretoria (2 ♀, TMP), Strubens Valley (1 ♀, AMG), Tswaing (2 ♂, PPRI; 1 ♂, TMP). **Kwazulu-Natal**: Durban (1 ♂, TMP), Kloof (1 ♂, BMNH), Magudu (1 ♂, TMP), Malvern (Arnold, 1923), Mfongosi in Zululand (1 ♀, SAM). **Mpumalanga**: Crocodile Bridge in Kruger National Park (1 ♂, PPRI). **Northern Cape Province**: 23 km S Alexander Bay at 28°46′S 16°37′E (1 ♂, AMG), Britstown (2 ♀, 1 ♂, AEI), Fraserburg (1 ♂, AMG), Gideonsfontein W Fraserburg at 31°47′S 20°57′E (3 ♂, PPRI), Goegap Nature Reserve 10 mi E Springbok (1 ♂, BMNH), Kalahari Gemsbok National Park 11 km NNE Twee Rivieren (3 ♀, AMG), 25 km E Niewoudtville at 31°29′S 19°19′E (1 ♂, AMG), Ritchie 50 km SSW Kimberley (1 ♀, OÖLM), Steinkopf in northern Namaqualand (1 ♂, SAM), Sutherland (3 ♀, 8 ♂, SAM), Sutherland District (4 ♂, SAM), Tanqua-Karoo National Park (6 ♀, 2 ♂, SAM), VanWyksfontein 8 km W Norvalspont (1 ♂, AMG), Victoria West (1 ♀, 1 ♂, AMG). **Northern Province**: Afguns (2 ♂, AMG), Ellisras (7 ♀, 4 ♂, AMG), Mogol Nature Reserve (1 ♀, 1 ♂, PPRI), 10 km SW Naboomspruit (1 ♀, FSCA), Nwanblya waterhole near Shingwedzi in Kruger National Park (1 ♀, ZMAN), Shingwedzi in Kruger National Park (1 ♀, SDNHM). **North-West Province**: Bloemhof (1 ♀, AMG), Lichtenburg (1 ♀, 2 ♂, TMP), Mafeking (3 ♂, ZMAN), 45 km N Pretoria (1 ♂, MS). **Western Cape Province**: Beaufort West (1 ♂, CU; 1 ♂, SAM), Cape Town (4 ♂; 2 ♀, 2 ♂, USNM), Ceres: Olifant River sources (1 ♂, SAM), between Ceres and Sutherland at 32°47′S 20°15′E (1 ♂, PPRI), Citrusdal (1 ♂, PPRI), Langberg (3 ♂, OÖLM), Merweville (2 ♀, 6 ♂, SAM), Mossel Bay (3 ♂ BMNH), 5 km W Robertson (1 ♂), Swartrivier 7 km NW Prince Albert (1 ♀, 7 ♂), Wellington: Rooshoek (4 ♂). **SRI LANKA**: **Monaragala District**: Mau Ara 10 mi E Uda Walawe (1 ♂, USNM). **Puttalam District**: Kali Villu in Wilpattu National Park (1 ♂, USNM). **Trincomalee District**: China Bay Ridge Bungalow (1 ♀, 1 ♂; 5 ♀, 20 ♂, USNM), Trincomalee, China Bay (2 ♂, USNM). **SUDAN**: Khartoum (Longstaff, 1911), Kosti (Longstaff, 1911). **TANZANIA**: **Arusha Region**: Meru (1 ♀, NRS, determined as *Tachysphex ferrugineipes* by P. Cameron), Ngorongoro Game Reserve entrance (1 ♀, USU). **Dar es**

Salaam Region: Dar es Salaam (1 ♂, UCD). **Iringa Region**: 12 km NNE Iringa (1 ♀, 4 ♂). **Kilimanjaro Region**: Mkomazi Game Reserve: Ibaya (1 ♂, SAM). **Morogoro Region**: 62 road km SW Morogoro (2 ♀), 48 road km W Morogoro (1 ♀). **Tanga Region**: 73 km NW Korogwe (14 ♀, 39 ♂; 2 ♀, 4 ♂, UDS), 10 km WNW Mabokweni (4 ♀, 1 ♂), 2 km NE Mkomazi (14 ♂), Pangani River Camp 86 km NW Korogwe (2 ♂). **Zanzibar Region**: Unguja (= Zanzibar Island): Kizimbani (1 ♂, RMNH). **TURKEY** (Pulawski, 1971): **Maraş**: Maraş area. **Urfa**: Urfa. **UGANDA**: Ngura (1 ♀, CU). **UNITED ARAB EMIRATES**: locality illegible, perhaps Fagsha or Faysha (1 ♀, KMG). **YEMEN**: Aden: Gebel Jihaf (1 ♂, BMNH); Rougrafat in Wadi el Gaber (1 ♂; 1 ♂, MHNCF), ca 30 air km from Sana'a at 15°14′N 43°60′E (1 ♂, CSE). **ZAIRE**: Lubumbashi (1 ♂, MRAC), Lwiro (1 ♂), 16 mi W Popokabaka (1 ♂), Sankuru (1 ♀, MRAC), Tenke in Shaba Province (1 ♀, BMNH), 10 mi N and 8 mi S Uvira (3 ♂). **ZAMBIA**: **Central Province**: Chibombo 97 road km N Lusaka (1 ♂). **Copperbelt**: Ndola (1 ♀, 1 ♂, AMG). **Eastern Province:** 31 km E Petauke (1 ♂), 32 km E Petauke (1 ♀, 1 ♂; 1 ♀, 1 ♂, MSNT; 1 ♂, NHMZ), 42 km SW Petauke (2 ♂). **Luapula Province**: Lake Bangweulu: N'Chili Island (1 ♂, BMNH). **Lusaka Province**: Lusaka International Airport (1 ♀). **Southern Province**: 8 km S Kafue (2 ♂), 9 km SW Kalomo (1 ♂). **ZIMBABWE**: Bulawayo (1 ♀, 1 ♂, AMG; 1 ♂, AMNH; 1 ♀, 2 ♂, PPRI; 1 ♀, SAM; 2 ♀, TMP), Bulawayo airport (1 ♀), Delt (1 ♂, SAM), Dete in Hwange National Park (1 ♀, OÖLM), 15 km E Gweru (1 ♂, USU), Hope Fountain (1 ♀, TMP), Iwaba near Kwekwe (1 ♂, BMNH), Kami Ruins (3 ♀, 3 ♂), Leighwoods 52 km SW Bulawayo (1 ♀), Matetsi in Hwange District (2 ♂, AMG), Matobo (1 ♀, 2 ♂, FSCA), Matobo Dam (1 ♀, NRS; 1 ♂, TMP), Mbizi Game Reserve (= Rocky Farm) 20 km SE Harare (3 ♂), Redbank at Kami River (1 ♂), Sawmills (1 ♀, AMG; 2 ♀, SAM; 2 ♀, TMP), Victoria Falls (1 ♀).

Tachysphex sexinus Leclercq

Figures 353, 354.

Tachysphex sexinus Leclercq, 1961:111, ♂. Holotype: ♂, Madagascar: Ranomafana (MHNB), examined.—Bohart and Menke, 1976:276 (listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Recognition.— *Tachysphex sexinus*, an all black endemic of Madagascar, differs from most of its congeners in having the supraantennal swelling microsculptured and punctate, dull. *Tachysphex cavatus* is similar, but differs in having conspicuously modified scutum and scutellum (see that species for details). The only other *Tachysphex* with a punctate swelling are *asinus*, *carinatus*, *onager*, *scaber*, *spectrum*, and some *ulonyovu*, whereas the swelling is rudimentary in *trystus* and some *harpax* (none of which occurs in Madagascan). In *asinus*, *onager*, *scaber*, and *ulonyovu*, however, the gaster and legs are at least partly red (see Recognition under those species for further differences); in *carinatus* sternum I has a prominent, longitudinal carina that is lacking in *sexinus*; and in *spectrum* the mesopleural punctures are minute (large in *sexinus*) and the propodeal side is unridged (ridged in *sexinus*). Subsidiary recognition features of *sexinus* are: setae of propodeal dorsum inclined anterad, venter of apical tarsomeres without spines, and female labrum with a small but well-defined notch.

Description.— Scutal punctures well defined, averaging about one diameter apart (many punctures 2–3 diameters apart in female). Mesopleural punctures conspicuous, varying from one to two diameters apart near center; interspaces microsculptured, dull. Episternal sulcus complete. Propodeal dorsum varying from longitudinally ridged to irregularly rugose, side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, on scutum anteriorly (about as long as midocellar diameter), and on each side of oral fossa next to occipital carina (length about 0.4 × basal mandibular width); oriented obliquely anterad on propodeal dorsum (basal setae diverging posterad in female).

Head, thorax, gaster, and legs black, mandible dark reddish mesally, tarsal apex red in some specimens. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal and subcostal veins brown. Terga I–IV in female, I–V in male, silvery fasciate apically.

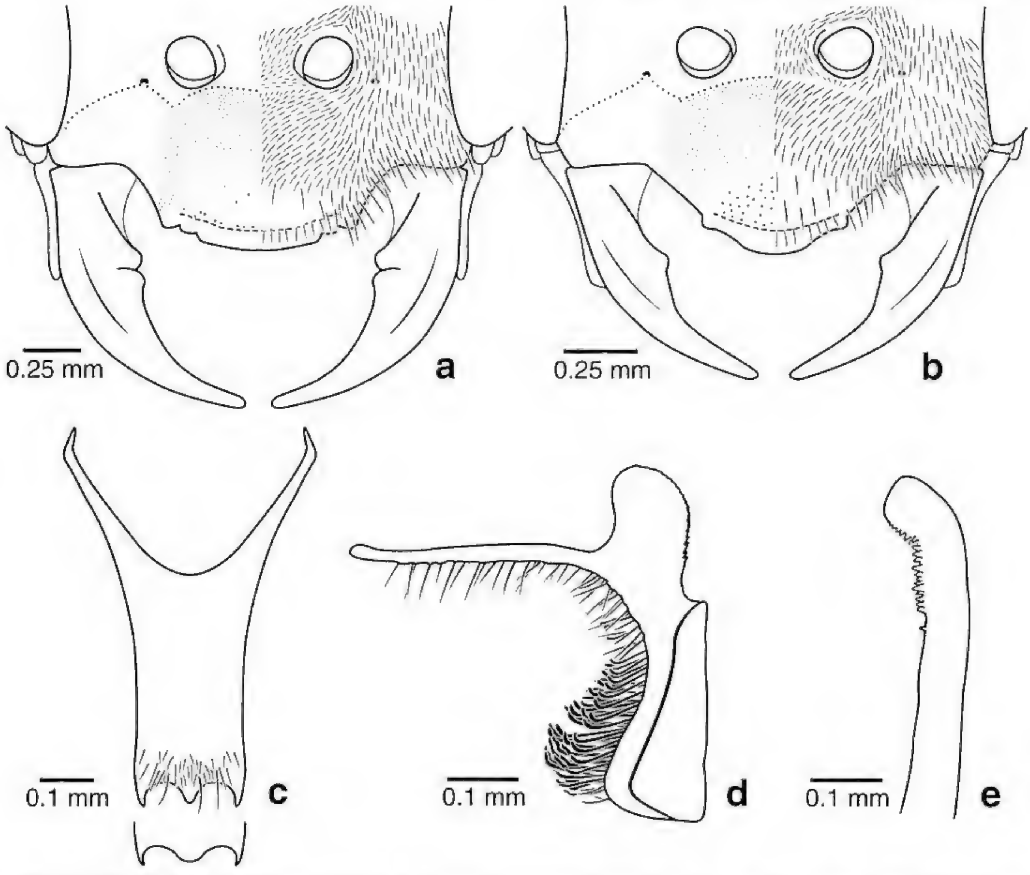


FIGURE 353. *Tachysphex sexinus* Leclercq: a – female clypeus and mandible; b – male clypeus and mandible; c – male sternum VIII; d – volsella; e – penis valve.

♀.— Labrum with small but well-defined notch. Clypeus (Fig. 353a): bevel shorter than basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.0 × length. Dorsal length of flagellomere I 2.6 × apical width. Scutellum flattened. Forecoxa with small apical process in some specimens. Forefemoral venter microsculptured and with a few, sparse punctures. Dorsal foretibial surface with several minute, suberect btristles; outer surface with several thin bristles. Forebasitarsus with 11–13 rake spines. Tergum V with minute punctures that are many diameters apart, its apical depression unsculptured, glabrous. Pygidial plate punctate, most punctures many diameters apart, interspaces aciculate. Length about 10.0 mm.

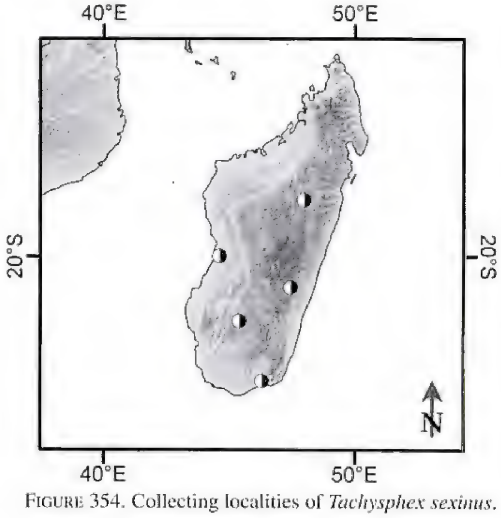


FIGURE 354. Collecting localities of *Tachysphex sexinus*.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 353b): bevel ill defined; lip free margin sinuate, with well-defined corner; distance between corners 0.8 × distance between corner and orbit. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 1.4–1.6 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Sterna III–VI or IV–VI each with large, impunctate area anterad of apical depression. Sternum VIII tridentate apically in most specimens (Fig. 353c), but only slightly convex mesally in one male from Berenty and intermediate in the other. Length 6.8–8.0 mm. Volsella and penis valve: Figs. 353d, e.

COLLECTING PERIOD.— April, May, 28 July, and November.

GEOGRAPHIC DISTRIBUTION (Fig. 354).— Madagascar.

RECORDS.— **MADAGASCAR**: **Fianarantsoa**: Ranohira (1 ♀, LB), 5 km SW Ranohira at 22°36′S 45°24′E (1 ♂), Ranomafana (1 ♂, MHNB, holotype of *sexinus*). **Toamasina**: 25 km W Morarano-Chrome at 17°45′S 47°59′E (1 ♀, 3 ♂; 1 ♀, 5 ♂, MRAC). **Toliara**: Bereboka 60 km NE Morondava (1 ♀, BMNH), Berenty (2 ♂, BMNH).

Tachysphex seyrigi Arnold

Figures 355, 356.

Tachysphex seyrigi Arnold, 1945:99, ♀, ♂ (as *Seyrigi*, incorrect original capitalization). Lectotype: ♂, Madagascar: Bekily (MNHN), **here designated**, examined.— Leclercq, 1960:99 (Madagascar), 1961:110 (Madagascar); Bohart and Menke, 1976:276 (listed); Leclercq, 1990:118 (Madagascar); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

RECOGNITION.— *Tachysphex seyrigi*, an endemic of Madagascar, is characterized by the following combination: gaster, femora, and tibiae black; mesopleuron with minute punctures that are ill defined in the male; setae straight (including mesopleural setae), erect on postocellar area (but shorter than one midocellar diameter), appressed or nearly so on scutum and midfemoral venter, inclined obliquely anterad on propodeal dorsum; and female apical tarsomeres not angulate basally and without small spines on lateral margins (Fig. 355c).

Several species share these characters, but *seyrigi* differs from most in having an unusually large clypeus (Figs. 355a, b): in the female, the distance between the lobe corners is about 1.5 × clypeal midline and about 2.0 × the distance between a corner and orbit; in the male, the distance between the lobe corners is practically equal to the clypeal midlength. The presence of a preapical ventral spine on tarsomeres V, in both sexes, is a subsidiary recognition feature. The clypeus is similar in the female of *sexinus*, but *seyrigi* has an impunctate, glabrous swelling above each antennal socket, and the female labrum is only minimally emarginate. In *sexinus*, the supraantennal area is uniformly punctate and setose, the apical tarsomeres have no preapical spine, and the female labrum has a well-defined emargination.

DESCRIPTION.— Scutal punctures averaging less than one diameter apart, but in female many discal punctures 2–3 diameters apart. Mesopleural punctures minute, well defined to ill defined, about 1–2 diameters apart beneath scrobe; interspaces microsculptured, dull. Episternal sulcus complete. Propodeal dorsum rugose in most specimens, transversely ridged in some; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, shorter than midocellar diameter; erect on each side of oral fossa next to occipital carina, about as long as 0.3 × basal mandibular width; shorter than midocellar diameter on scutum and midfemoral venter; oriented obliquely anterad on propodeal dorsum.

Head, thorax, legs, and gaster black, mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane moderately infumate; forewing costal and subcostal veins dark brown. Terga I–III in female, I–IV in male, silvery fasciate apically.

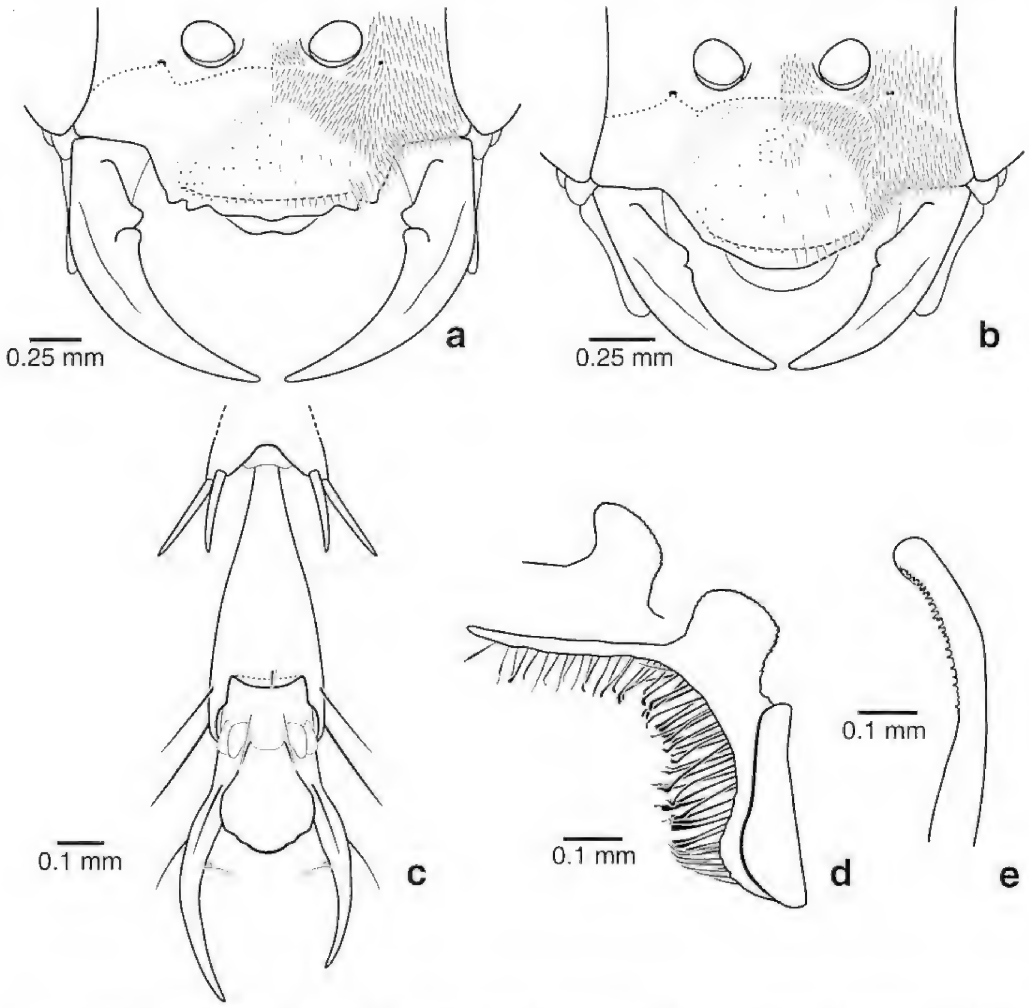


FIGURE 355. *Tachysphex seyrigi* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – hindtarsomere V of female in ventral view; d – volsella with outline showing variation; e – penis valve.

♀.— Labrum minimally, shallowly concave mesally. Clypeus (Fig. 355a): bevel longer than basomedian area; lip free margin arcuate, with two lateral incisions on each side, distance between corners 2.0–2.1 × distance between corner and orbit. Width of postocellar area 1.4 × length. Dorsal length of flagellomere I 2.4 × apical width. Forefemoral venter minutely punctate (punctures many diameters apart in one female), impunctate basally. Dorsal foretibial surface with two spines; outer surface with two or three thin bristles. Forebasitarsus with 12 or 13 rake spines. Tarsomeres V: venter with one preapical spine, apicoventral margin arcuate (Fig. 355c). Tergum V with a few, scattered punctures, interspaces unsculptured; apical depression impunctate, glabrous. Pygidial plate with punctures several to many diameters apart, interspaces unsculptured. Length 10.0–10.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 355b): bevel unsharply delimited, shorter than basomedian area; lip free margin arcuate, with ill-defined corner; distance between corners 1.1–1.2 × distance between corner and orbit. Width of postocellar area 1.1–1.6 ×

length. Dorsal length of flagellomere I 1.5–1.8 × apical width. Forefemoral notch minutely setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Venters of tarsomeres V each with long, preapical seta. Sterna III–VI with large, impunctate area anterad of apical depression. Length 6.0–9.1 mm. Volsella and penis valve: Figs. 355d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 356).— Madagascar.

RECORDS.— **MADAGASCAR: Antananarivo:** Ankaratra (1 ♀, MRAC). **Toliara:** Bekily (2 ♀, 1 ♂, MNHN, lectotype and paralectotypes of *seyrigi*), Berenty (1 ♀, 17 ♂; 3 ♀, BMNH; 1 ♀, MRAC), 38 km E Sakaraha (1 ♂).

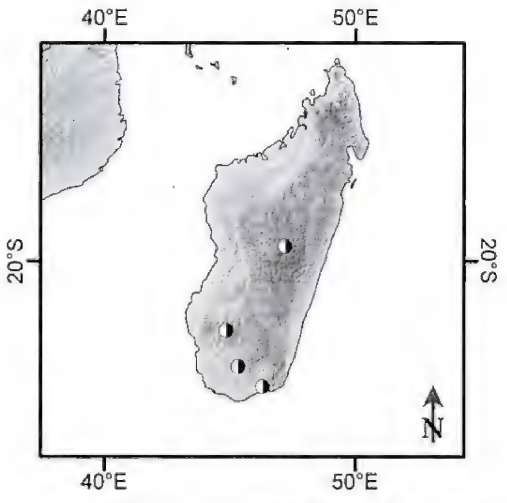


FIGURE 356. Collecting localities of *Tachysphex seyrigi*.

***Tachysphex silvestris* Pulawski, sp. nov.**
Figures 357, 358.

DERIVATION OF NAME.— *Silvestris*, a Latin adjective meaning of or belonging to a wood or forest; an allusion to the type locality habitat.

RECOGNITION.— The female of *silvestris* has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate, almost straight, apicoventral margin roundly prominent mesally; tarsomeres V angulate basoventrally, each with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe; and on each leg one claw smaller than the other (Figs. 357d-f). Unlike most other species with these characteristics, the forebasitarsus of *silvestris* has only 5–7 rake spines (Fig. 357c). *Tachysphex agilis* and *suavis* are the only other species of continental Africa with a similar rake structure, but in *silvestris* the tibiae are black (mid- and hindtibiae largely red in *agilis*), the width of postocellar area is 1.0–1.2 × length (1.5–1.7 × length in *suavis*), scutal punctures are equal in size or nearly so (scutal punctures of *suavis* are of two discrete types: denser small and sparser large), setae of the propodeal dorsum are all erect or inclined posterad (rather than oriented anterad basally). Also, the punctures of the pygidial plate are several diameters apart in *silvestris*, at least posteromesally, whereas the plate of *suavis* is variably sculptured: punctatorugose, or with punctures that are less than one diameter apart, or with punctures that are more than one diameter apart mesally.

The male of *silvestris* can be recognized by the presence of a central cluster of small spines on the venter of apical tarsomeres, in combination with the following: gaster either all black or with red apex, mesopleural punctures ill defined, several diameters apart, interspaces microsculptured, dull; setae suberect to markedly inclined posterad on scutum, slightly inclined posterad on the propodeal dorsum; propodeal side ridged; and sterna densely, uniformly punctate or nearly so, finely setose. In addition, the clypeal middle section is flat, and the lip corners are closer to adjacent orbits than to each other; the forebasitarsus, in most specimens, has one or more preapical rake spines, and the outer apical spine of foretarsomere II is shorter than foretarsomere III. Unlike *suavis*, the male of *silvestris* has no lateral carinae on tergum VII.

DESCRIPTION.— Scutal punctures well defined, averaging about two diameters apart on disk (three or four diameters in some specimens); interspaces microsculptured. Mesopleural punctures

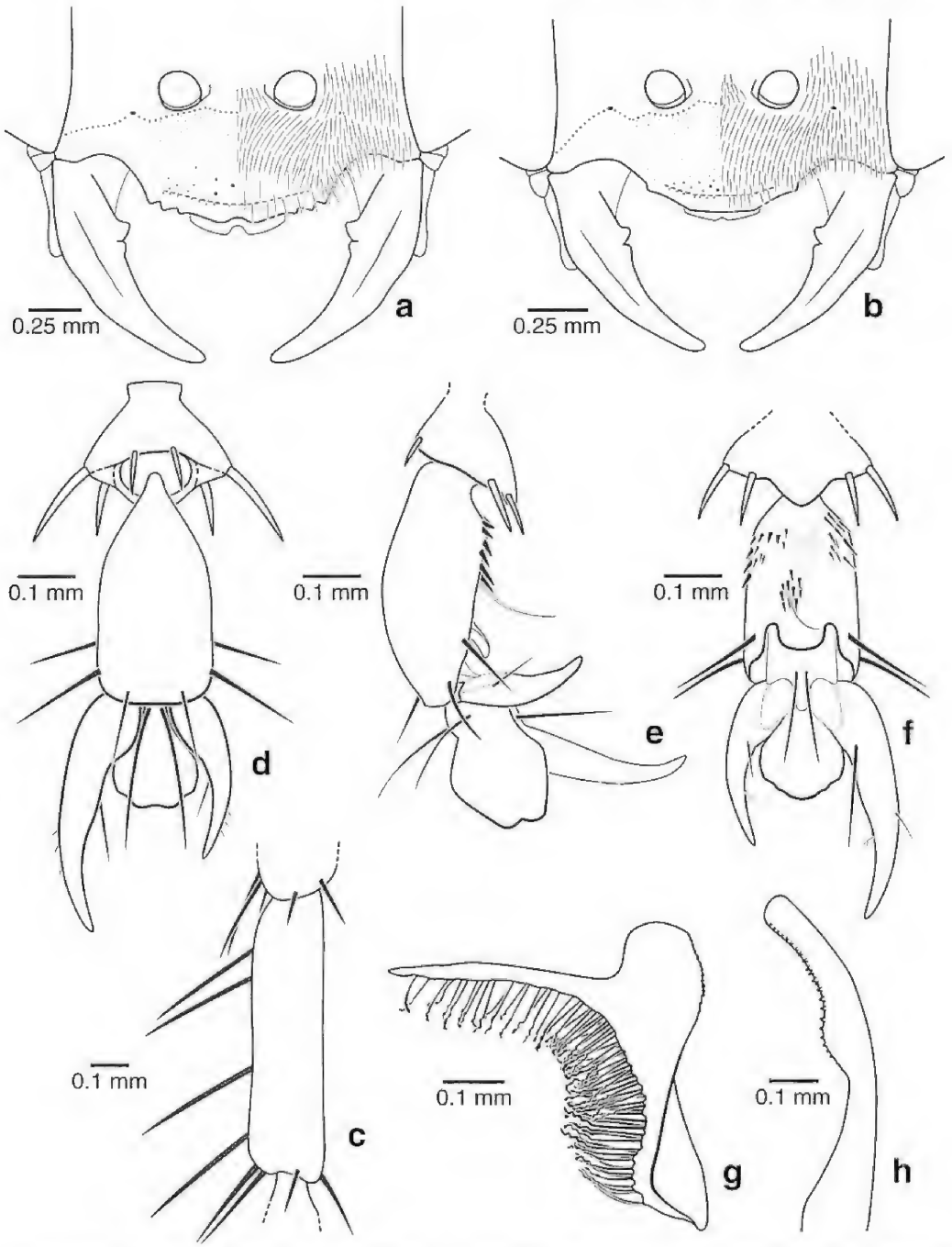


FIGURE 357. *Tachysphex silvestris* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – female forebasitarsus; d – female hindtarsomeres IV and V in dorsal view; e – same in lateral view; f – same in ventral view; g – volsella; h – penis valve.

minute, several diameters apart (relatively large in single female from Cameroon); interspaces dull, microsculptured. Propodeal dorsum irregularly ridged longitudinally (ridges irregularly anastomosed); side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on each side of oral fossa next to occipital carina, about as long as 0.3 of basal mandibular width; erect on postocellar area, erect or nearly so on scutum in female and suberect to obliquely inclined posterad in male, about equal to midocellar diameter; slightly inclined posterad on propodeal dorsum; setae of midfemoral venter suberect, about equal to midocellar diameter in female, slightly less than that in male.

Head and thorax black, mandible red at about two thirds of length. Frontal setae silvery in female, silvery or with golden tinge in most males but golden in those from Zaire. Wing membrane slightly infumate; forewing costal vein brown, subcostal vein dark brown. Legs black except tarsal apex reddish in most females, and tarsi all or largely red in male. Gaster all black in most populations, but one or two apical segments red in some specimens from Foro-foro, Ivory Coast. Terga I–III silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 357a): bevel ill defined, shorter than basomedian area; lip free margin slightly arcuate, emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.8–2.2 × apical width. Scutum and scutellum flattened. Midtrochanteral venter: punctures minute, several diameters apart. Forefemoral venter with minute punctures that are several to many diameters apart. Dorsal foretibial surface with minute, inconspicuous bristles; outer surface with two or three thin bristles but no spines. Forebasitarsus with 5–7 rake spines (Fig. 357c), in most specimens two apical spines with sockets confluent (no sockets confluent or three sockets confluent in some, or two sockets confluent on one leg and three on other); foretarsomere II with three apical and one adapical rake spines, in many specimens also with one spine near midlength (the apical spines with sockets confluent or nearly so). Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical margin very broadly emarginate (almost straight) and apicoventral margin roundly projecting (Figs. 357d, f); outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; lateral margin with row of small spines subbasally; apicoventral margin produced into lobe (Figs. 357e, f). Outer claws of mid- and hindtarsi shorter, thinner than inner claws (Figs. 357d–f), opposite on foretarsus. Apical depression of tergum V unsculptured, glabrous. Pygidial plate with well-defined punctures that in most specimens concentrate along margins (several diameters apart at least posteromesally); interspaces almost unsculptured. Length 8.4–10.1 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 357b): middle section flat, bevel rudimentary or absent; lip free margin arcuate or sinuate, with well-defined corner; distance between corners 1.4–1.5 × distance between corner and orbit. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 0–4 preapical rake spines (numbers of spines may differ in the same specimen, e.g., three on one leg and one on other); outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with preapical cluster of minute spines. Length 6.9–8.5 mm. Volsella and penis valve: Figs. 357g, h.

Geographic distribution (Fig. 358).— Ivory Coast to Zanzibar Region of Tanzania.

Records.— Holotype: ♀, **IVORY COAST**: **Abijan**: Forêt de Banco, 23 Jan 1991, WJP (CAS). Paratypes: **CAMEROON**: **Nord**: 15 km W Campement des Eléphants and 67 km S Garoua, 13–19 July 2002, WJP (1 ♀). **GABON**: Assok Ngum at 1°42′N 11°39′E, 19–21 Feb 1986, A. Pauly (2 ♂; 4 ♂, FSAG). **GHANA**: Breku 40 km E Kononga, 31 Jan 1991, WJP (1 ♀, 1 ♂). **IVORY COAST**: Abijan: Forêt de Banco, 5 Jan 1991, AM (7 ♂, MSNT) and WJP (5 ♀, 21 ♂); same locality, 23 Jan 1991, WJP (9 ♀, 2 ♂); 40 km NW

Abijan, 6 Jan 1991, WJP (1 ♀); Bouaké, 1974 (day and month not indicated), D. Duviard (28 ♀); Bouaké: Foro-foro, January through December, 1971–1973, same collector (5 ♀, 2 ♂; 110 ♀, 21 ♂, UCD); Lamto, 23 Sept 1971, D. Lachaise (1 ♀, MNHN); 40 km N Man, 14 Jan 1991, WJP (1 ♀); Ouro 30 km W San Pédro, 17 Jan 1991, WJP (1 ♀); 10 km N San Pédro, 18 Jan 1991, WJP (2 ♀). **KENYA**: **Coast Province**: Tiwi Beaches ca 17 km S Mombasa, 24–26 June 1999, J.S. Schweikert and WJP (2 ♀). **TANZANIA**: **Zanzibar Region**: Pemba Island, 15–23 Sept 1924, H.J. Snell (1 ♀, BMNH); Unguja (= Island of Zanzibar): airport, 8 June 1988, AM (MSNT). **TOGO**: Lomé, 23 Feb 1991, WJP (1 ♀). **ZAIRE**: **Bandundu Province**: 46 mi W Idiofa, 7 Aug 1957, E.S. Ross and R.E. Leech (2 ♂).

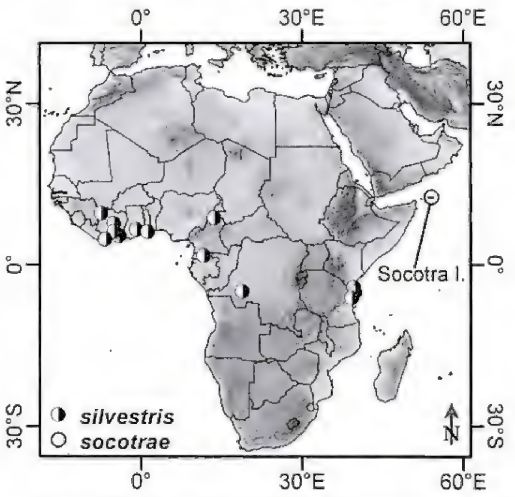


FIGURE 358. Collecting localities of *Tachysphex silvestris* and *socotrae*.

Tachysphex socotrae Pulawski, sp. nov.

Figures 358, 359.

DERIVATION OF NAME.— Named after the Socotra Island where this species occurs.

RECOGNITION.— *Tachysphex socotrae*, an endemic of the Socotra Island, has the labrum convex and markedly protruding beyond the clypeal free margin, galea about as long as the scape, propodeal side microareolate (all or largely so), glabrous adjacent to the metapleural sulcus, and setae appressed on the postocellar area and scutum. It resembles *dolosus* in having the longest setae of the lower gena markedly longer than midocellar diameter and setae of the propodeal dorsum oriented anterad (as in Fig. 124a), a unique such combination among the species with a convex labrum. Unlike *dolosus*, the punctures of the scutal disk are sparse (with shiny, unsculptured interspaces) in the female and many males of *socotrae*, and the corner of the male clypeus lip is prominent (Fig. 369b); also the volsellae are different (compare Figs. 359c and 124b).

Another species with a convex labrum that has a sparsely punctate scutal disk is *caliban* and, to a lesser degree, *atlanteus*. In both the setae of the propodeal dorsum are inclined posterad in the apical half (all or only sublateral ones) and in *caliban* the genal setae are no longer or slightly longer than the midocellar diameter.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea densely punctate (punctures about one diameter apart), impunctate anteriorly, about as long as 0.9–1.1 × scape. Scutal punctures in female averaging several diameters apart on disk (interspaces unsculptured, shiny), in male varying from about one to several diameters apart on disk (interspaces microsculptured, dull). Mesopleuron dull, evenly microsculptured. Propodeal dorsum evenly microareolate; side evenly microsculptured (all or largely so). Hindcoxal dorsum with inner margin carinate basally.

Setae straight, suberect on each side of oral fossa next to occipital carina, longest setae about 0.4 × basal mandibular width, markedly longer than midocellar diameter; appressed on postocellar area and scutum; oriented anterad on propodeal dorsum; propodeal side glabrous anteriorly.

Head and thorax black, mandible (except apical third) and clypeal bevel in female and many males yellowish red. Frontal setae silvery in both sexes. Wing membrane slightly infumate to nearly hyaline; costal vein of forewing light brown to brown, subcostal vein brown (both veins identical in color in some specimens). Femora in female all red or black basodorsally, in male varying from largely red to black except red apex; tibiae and tarsi red. Gaster red in female, in male three

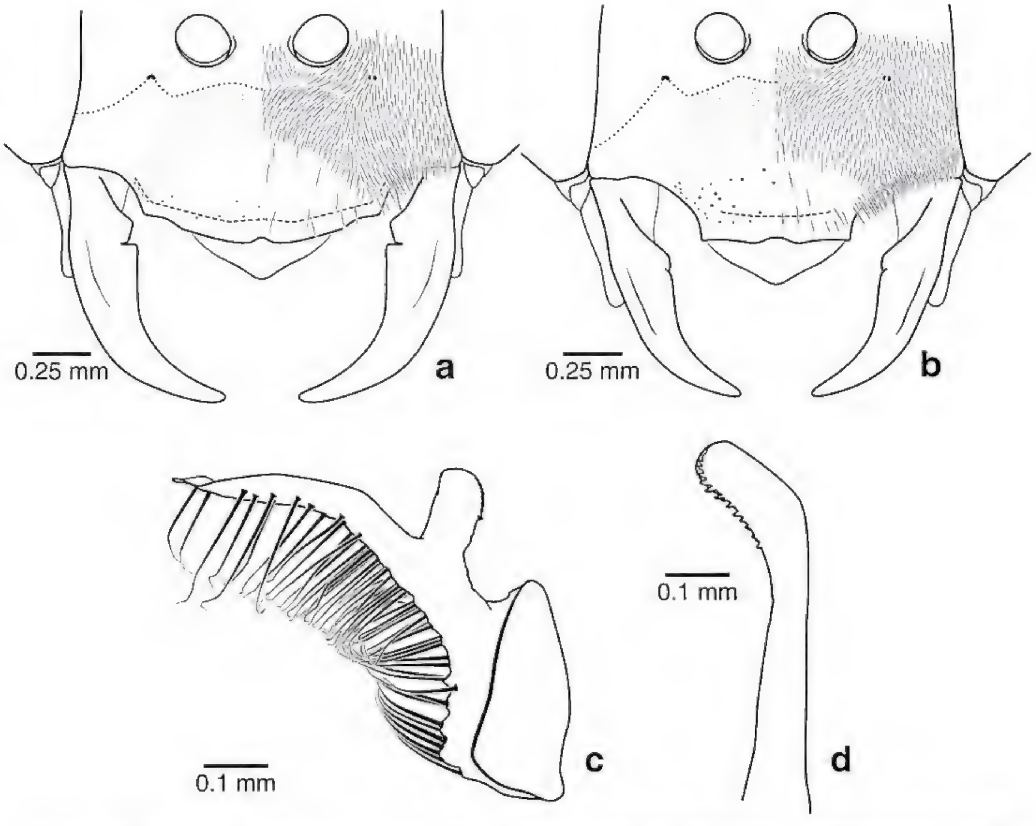


FIGURE 359. *Tachysphex socotrae* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

or four apical segments brown. Terga I–III inconspicuously silvery fasciate apically (fasciae broadly interrupted mesally).

♀.— Clypeus (Fig. 359a): bevel longer than basomedian area; lip free margin arcuate, shallowly emarginate mesally, sinuous laterally. Width of postocellar area 0.6 × length. Dorsal length of flagellomere I 2.7–3.0 × apical width. Forecoxa with short apicomedian process. Dorsal foretibial surface with three spines; outer surface with two or three spines. Forebasitarsus with 7–9 rake spines (mostly eight). Apical spines of hindtarsomere IV reaching claw bases. Apical depression of tergum V varying from impunctate to minutely punctate. Pygidial plate microsculptured and with shallow, inconspicuous punctures that average many diameters apart. Length 8.8–11.7 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 359b): bevel shorter than basomedian area, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin nearly truncate, emarginate mesally; lip corners prominent, about equidistant from each other and orbit. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.1–2.4 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 4–6 rake spines. Outer apical spine of foretarsomere II longer than tarsomere III. Length 7.2–8.2. mm. Volsella and penis valve: Figs. 359c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 358).— Island of Socotra.

RECORDS.— HOLOTYPE: ♀, **YEMEN**: **Socotra**: Hadibo Plain, 4 Apr 1967, K.M. Guichard (BMNH).

PARATYPES (same locality, year, and collector): 19 Mar (1 ♂, BMNH; 1 ♂, KMG), 4 Apr (1 ♀, 1 ♂; 3 ♂, BMNH; 1 ♀, KMG), 7 Apr (1 ♀ 1 ♂; 4 ♀, 2 ♂, BMNH; 1 ♀, 1 ♂, KMG), 11 Apr (3 ♀, BMNH).

Tachysphex sordidus (Dahlbom)

Figures 360, 361.

Tachytes sordidus Dahlbom, 1845:470, ♂ (as *sordida*, incorrect original termination). Lectotype: ♂, "Egypt", actually Greece: Island of Rhodes (NRS, Hedenborg coll.), designated by de Beaumont, 1947b:391, not examined.— As *Tachysphex sordidus*: Kohl, 1885a:397 (tentative new combination, original description copied); Dalla Torre, 1897:694 (in catalog of world Hymenoptera); de Beaumont, 1940:170 (not found in Egypt); Honoré, 1942:56 (described from Egypt in error); de Beaumont, 1947a:176 (in revision of Egyptian *Tachysphex*, occurrence in Egypt doubtful), 1947b:391 (Cyprus); Pittioni, 1950:25 (Cyprus); de Beaumont, 1960a:16 (Greece: Island of Rhodes); Pulawski, 1971:417 (in revision of Palearctic *Tachysphex*); Kazenas, 1972:163 (Kazakhstan); Myartseva, 1972a:79 (Turkmenistan); de Beaumont, Bytinski-Salz, and Pulawski, 1973:13 (Israel); Bohart and Menke, 1976:276 (listed); Georghiou, 1977:192 (Cyprus); Kazenas, 1978:114, 126 (in key to Sphecidae of Kazakhstan and Central Asia); Islamov, 1986:527 (Uzbekistan); Nazarova, 1998:41 (Tajikistan); Kazenas, 2001:30 (in checklist of Sphecidae of Kazakhstan and Central Asia), 2002a:75 (geographic distribution, collecting localities in Kazakhstan).

Tachysphex lebedevi Gussakovskij, 1952:238, ♀, ♂. Lectotype: Tajikistan: Koy-pyaz-tau (ZIN), designated by Pulawski, 1971:419, examined before 1971. Synonymized with *Tachysphex sordidus* by Pulawski, 1971:417 and 419.

As *Tachysphex fluctuatus*: Morawitz, 1894:342 (Turkmenistan: Repetek), corrected to *Tachysphex sordidus* by Pulawski, 1971:417.

As *Tachysphex grandissimus* (♂ only): Gussakovskij, 1933:382 (Iran), corrected to *Tachysphex sordidus* by Pulawski, 1971:417.

RECOGNITION.— *Tachysphex sordidus* is one of the species in which the apical depression of sternum I is intersected by a longitudinal carina (as in Fig. 132a) and hindwing vein cu-a is oblique (anal end further away from wing base than cubital end). In the male, the apical depression of at least sternum III is covered with appressed setae that are markedly longer than those of remaining surface (Fig. 360e). As in *grandissimus* and *osiris*, the female has no spines on the lateral margins of apical tarsomeres and in the male the setae of the apical depressions on sternum III (and on the following sterna in most specimens) are dense, as if agglutinated.

The female differs from *grandissimus* and *osiris* in having the clypeal bevel clearly step-like, the gena noticeable in dorsal view (Fig. 360c), setae largely but not entirely concealing integument on thorax and gena (rather than entirely concealing), and the pygidial plate broad basally and contrastingly narrowing preapically (Fig. 360d). Unlike *osiris*, it has an emarginate labrum, clypeal lip incised laterally (Fig. 360a), frons not unusually convex; hindfemoral venter setose, flagellum black, and marginal cell densely microsetose.

The male differs from *grandissimus* in having many mesopleural punctures more than one diameter apart (punctures compressed against each other in *grandissimus*) and the frontal setae golden (but silvery in the smallest specimens). Unlike *osiris*, the outer margin of the forebasitarsus has at most one preapical spine that is close to apical one (rather than 4–6 spines), the outer apical spine of foretarsomere II is at most as long as foretarsomere III (rather than longer), and sternum II is all setose (rather than glabrous in most specimens).

DESCRIPTION.— Scutal punctures less than one diameter apart in female and most males, about one diameter apart on disk in some males. Mesopleural punctures superficial, somewhat ill defined, almost compressed against each other in female, several diameters apart at center in male. Propodeal dorsum rugose; side ridged; posterior surface, in dorsal third or so, with wide median impression. Hindwing jugal lobe enlarged (as in Fig. 102a), crossvein cu-a oblique (anal end fur-

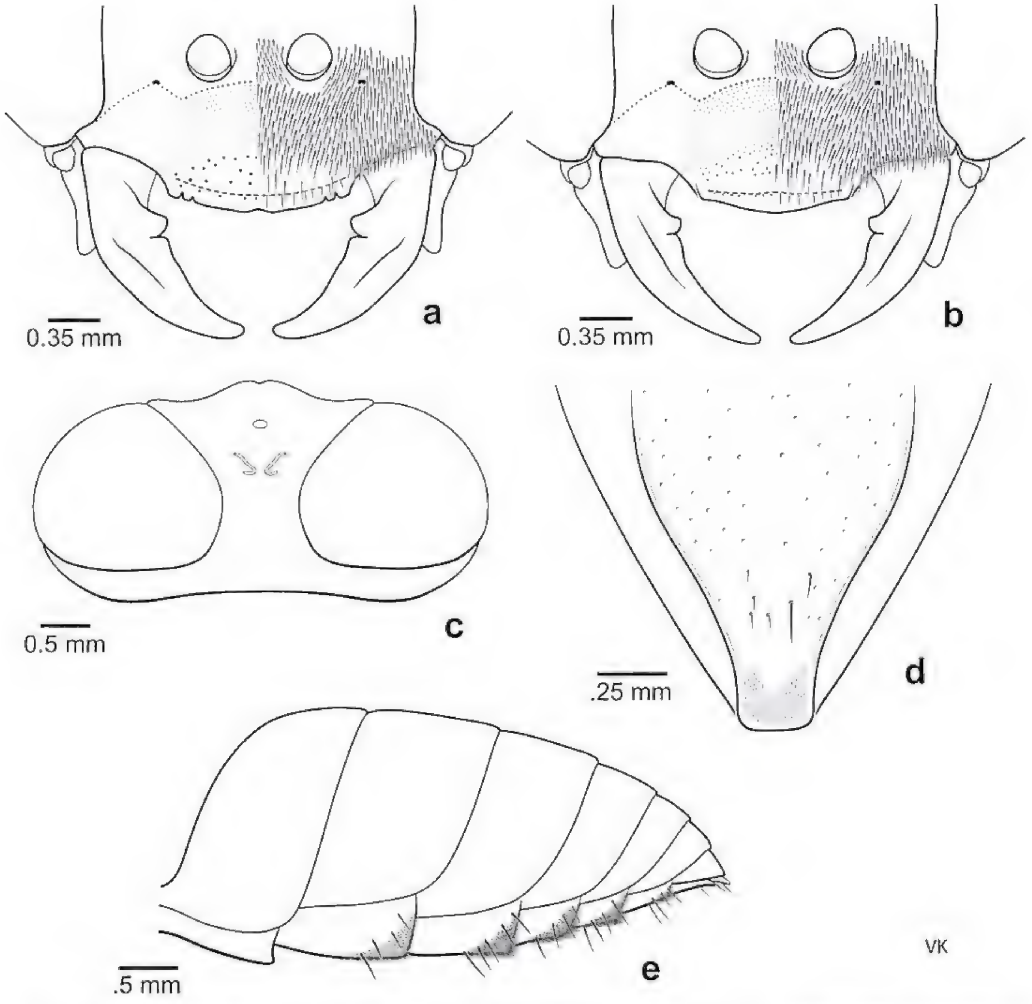


FIGURE 360. *Tachysphex sordidus* (Dahlbom): a – female clypeus and mandible; b – male clypeus and mandible; c – female head in dorsal view; d – pygidial plate of female; e – male gaster in lateral view.

ther away from wing base than cubital end). Hindcoxal dorsum with inner margin carinate basally. Sternum I with apical depression that is bisected by longitudinal, obtuse carina (as in Fig. 132a).

Setae erect on each side of oral fossa next to occipital carina, about 1.5 × as long as midocellar diameter; appressed on postocellar area in female, in male suberect, inclined anterad, about as long as 0.5 × midocellar diameter; appressed on scutum; oriented posterad on propodeal dorsum (erect basomedially).

Head and thorax black, mandible dark reddish mesally. Frontal setae silvery in female and smallest males, golden in most males. Wing membrane slightly infumate; costal vein of forewing yellowish brown, subcostal vein dark brown. Femora black, red apically in most specimens; hindfemur largely red in some females. Tibiae and tarsi red, but fore- and midtibiae partly black and hindtibia all black in single specimen from Oman. Gastral segments I and II red in female, remainder black (apical depression of tergum II and sternum II all black in some specimens); gaster all

black in male. Terga I–IV silvery fasciate apically in female (terga I–III in females from Cyprus and Israel); terga I and II or I–III fasciate in male (I–IV in single male from Oman).

♀.— Labrum emarginate. Clypeus (Fig. 360a): bevel shorter than basomedian area, steeply sloping toward lip base; lip free margin arcuate, emarginate mesally, with one or two lateral incisions on each side. Width of postocellar area 0.8 × length. Gena thick in dorsal view (Fig. 360c). Dorsal length of flagellomere I 2.3–2.7 × apical width. Dorsal foretibial surface with three or four spines; outer surface with three or four spines. Forebasitarsus with 12 or 13 rake spines. Apical tarsomeres with two subbasal and one or two preapical spines on venter, lateral margins without spines. Apical depression of tergum V unsculptured, glabrous. Pygidial plate broad basally, markedly narrowed preapically (Fig. 360d), with punctures that average several diameters apart, aciculate preapically. Length 12.0–15.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 360b): bevel shorter than basomedian area, delimited laterally by short, longitudinal carina emerging from lip corner; lip free margin arcuate, emarginate mesally in many specimens, with well-defined corner; distance between corners 1.2–1.3 × distance between corner and orbit. Width of postocellar area 0.2–0.5 × length. Dorsal length of flagellomere I 1.9–2.4 × apical width. Forefemoral notch glabrous. Outer margin of forebasitarsus with at most one preapical rake spine that is close to apical one; outer apical spine of foretarsomere II as long as tarsomere III or shorter. Venter of tarsomeres V with one spine. Sternum II: setae as long on apical depression as on remaining surface; apical depressions of sterna III–V (of sternum III only in single specimen from Oman) covered with appressed, dense setae that appear agglutinated (Fig. 360e). Sterna either densely, evenly punctate or (most specimens) sterna V and VI with sparse punctures anterad of apical depression. Length 8.2–12.3 mm. Volsella and penis valve as in *costae* (Figs. 102b, c).

Geographic distribution (Fig. 361).— Greece (Island of Rhodes), Cyprus, Turkey, Israel, Oman, Azerbaijan, Iran, Central Asia (Kazakhstan, Uzbekistan, Turkmenistan, Tajikistan).

Records.— AZERBAIJAN: Mashtagi in Apsheron Peninsula (Pulawski, 1971). **CYPRUS**: Akrotiri (de Beaumont, 1947b), Cherkes (6 ♀, 4 ♂), Limassol (1 ♂), Moni River (de Beaumont, 1947b), Yermasoyia River (4 ♂), Zakaki (1 ♂). **GREECE**: **Island of Rhodes**: Ixia (Pulawski, 1971), Kamiros (Pulawski, 1971), Kremasti (de Beaumont, 1960a), Phileremos (de Beaumont, 1960a). **IRAN**: **Ardabil**: unghut Mugan (Pulawski, 1971). **Kerman** (Pulawski, 1971): Bazman, Khunikaka, Podachi. **Khorasan**: Fazel 9 km W Mashad (1 ♀, 1 ♂), 32 km E Mashad (2 ♂). **Teheran**: Poolikh 80 km NW Teheran (1 ♂). **ISRAEL** (de Beau-

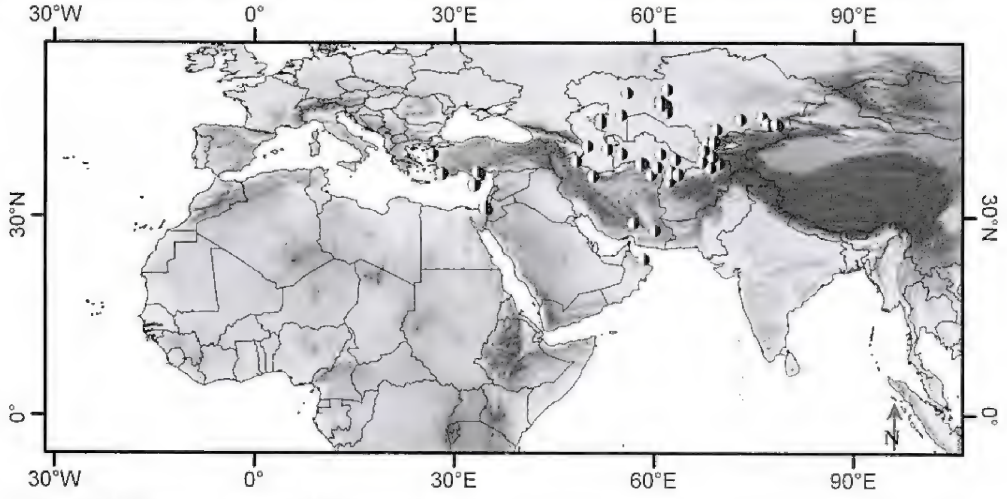


Figure 361. Collecting localities of *Tachysphex sordidus*.

mont, Bytinski-Salz, and Pulawski, 1973, or as indicated): Beersheba (3 ♂), Bir Rehme = Kfar Yeroham 30 km SSE Beersheba (3♀), Gevulot, Revivim, Shibolim. **KAZAKHSTAN** (K = Kazenas, 2002, P = Pulawski, 1971): **Aktöbe**: 60–80 km NE Irghiz (K), Malye Barsuki sands near Aral Lake (P), Oymautskiy in Bauganin District (K). **Almaty**: Bakanas (K), Borandysu 30 km E Chilik (K), 60 km E Chilik (K), Ili 70 km NNE Almaty (K, P), Kapchagai (K), Kaskelen River 50 km N Almaty (1 ♀, 3 ♂), Myn Bulak on Ili River near Ayak-Kalkan (K). **Mangghystaū**: Ak-Bas 25 km SE Tauchik (P), Bas-Kuduk 90 km SE Tauchik (K, P), Beyneu (K), Karatau Range (K), Koilus (K), Sumsa (K). **Qostanay**: Zhalanash (K), 35 km NW Zhalanash (K). **Qyzylorda**: Akdjar-Mailibay in Kazalinsk District (P), 5 km E Akespe = 80 km W Aral'sk at about 47°N 60.5°E (K), 6 km W village Amanotkel' at about 46°N 61.5°E (1 ♂), 15 km SE Aral'sk (K), Chokusu railroad station 30 km NW Saksaul'skiy (1 ♂), 3 km NW Kamyshlybash (K), 28 km SW Kazalinsk (K), 14 km SE Saksaul'skiy (1 ♀). **South Kazakhstan**: 30 km S Chardara (K), Chayan (K). **Zhambyl**: S portion of Betpakdala (K). **Location unknown**: Koylus (P). **OMAN**: Al Bagriya at 23°32.3′N 58°31.3′E (1♂). **TAJIKISTAN**: Dushanbe (1 ♂), Kondara 35 km N Dushanbe (1 ♀, 1 ♂), Koy-pyaz-tau near Kabadian (Gussakovskij, 1952), Kulab (Pulawski, 1971), Kvak 35 km N Dushanbe (Pulawski, 1971), Pugus 30 km N Dushanbe (Pulawski, 1971), Ruidasht 40 km N Dushanbe (Pulawski, 1971), Tigrovaya Balka Nature Reserve (Nazarova, 1998). **TURKEY**: **Çanakkale**: Ayvalik (1 ♂). **Mersin**: Eksiler (2 ♂), Mut (Pulawski, 1971). **TURKMENISTAN** (Pulawski, 1971 or as indicated): Akhcha-Kuyma near Nebit-Dagh, Askhabad, Chuli Pass in Kopet-Dagh, Imam Baba in Mary District, Kalai-Mor, Krasnovodsk, Kushka, Repetek, Sandy-Lachi (Myartseva, 1972a), Sary-Chop 180 km S Mary, Tedjen (2 ♂), Unguz. **UZBEKISTAN**: Baisun in Karzhantau Range in Surkhandarya Oblast' (Islamov, 1986), Kyrk-Kuduk near Tashkent (Pulawski, 1971), Saraylaylik (Pulawski, 1971), steppes between Tashkent and Syr-Darya (Pulawski, 1971).

Tachysphex speciosissimus Morice

Figures 362, 363.

Tachysphex speciosissimus Morice, 1897:308, ♀. Holotype: ♀, Egypt: Koubbeh near Cairo (OXUM), examined in 1974.— de Beaumont, 1940:177 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:206 (in revision of Egyptian *Tachysphex*); Pulawski, 1971:109 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:7 (Israel); Bohart and Menke, 1976:276 (listed).

Tachysphex redivivus Kohl, 1901:781, ♀. Holotype: ♀, Egypt: Cairo (NHMW), examined before 1971. Synonymized with *Tachysphex speciosissimus* by de Beaumont, 1940:178.— Dollfuss, 1989:13 (type material in NHMW).

As *Tachysphex fasciatus* (♂ only): de Beaumont, 1940b:178 and 1947a:207 (corrected to *Tachysphex speciosissimus* by Pulawski, 1971:109 and 112).

RECOGNITION.— *Tachysphex speciosissimus* has a flat labrum, hindwing vein cu-a vertical, and apical tarsomeres without spines on the venter or lateral margins. In addition, the free margin of the lateral clypeal section is shallowly concave, almost straight (Figs. 362a, b), the scapal venter is unsculptured, shiny, glabrous, the mesopleuron is dull, finely rugose, and in most specimens the propodeal side is all setose.

The female of *speciosissimus* differs from other such species in having trochanteral venters I–III shiny, unsculptured except for a few, sparse punctures. The inner hindtibial spur of many specimens has sparsely spaced rays in the middle third or so, a subsidiary recognition feature.

The male differs in having trochanteral venters I–III or II and III unsculptured except for a few, sparse punctures, and in most specimens sternum II with only a few, sparse punctures and associated setae on a broad, median zone that extends from the sternal base to the apex (sparsely punctate area reduced in males from Pakistan). Additionally, it has a well-defined foretarsal rake, with the outer apical spine of foretarsomere II as long as tarsomere III or longer.

Tachysphex speciosissimus closely resembles the Central Asian *hostilis* Kohl, but differs in having well-defined silvery fasciae on at least terga I–IV, closely micropunctate female terga, and

black gastral apex in the male. In *hostilis*, the silvery tergal fasciae are ill defined, female terga are sparsely micropunctate, and the male gaster is all red.

Description.— Postocellar area shallowly concave. Scapal venter unsculptured, shiny, asetose. Scutal punctures well defined, up to 2–3 diameters apart on disk; interspaces shiny. Mesopleuron finely rugose, dull. Punctures of mesothoracic venter, except along midline, varying from about one to several diameters apart. Episternal sulcus complete in some specimens. Propodeal dorsum varying from almost evenly microareolate to finely rugose or finely ridged; side either finely rugose or evenly microsculptured but not ridged (contrary to Pulawski, 1971); posterior face at most with ill-defined ridges. Hindcoxal dorsum carinate basally. Trochanteral venters I–III or II and III unsculptured except for a few, sparse punctures. Inner hindtibial spur, in most females, with thick, relatively sparse rays near midlength (rays dense, usual, in two females from Mauritania).

Setae subappressed on postocellar area in female, suberect to erect in male, shorter than midocellar diameter (as long as midocellar diameter in males from Pakistan); suberect, about as long as midocellar diameter on each side of oral fossa next to occipital carina; appressed to suberect anteriorly on scutum; inclined anterad on propodeal dorsum; suberect to appressed on midfemoral venter. Scutal setae variously oriented; diverging posterolaterad in some specimens, arranged in characteristic rosette-like pattern in some others; oriented posterad along midline in middle third of length or so, oriented transversely adjacent to midline. Propodeal side setose throughout except asetose along metapleuron in two females from Mauritania.

Head and thorax black, mandible yellowish red except basally and apically. Frontal setae sil-

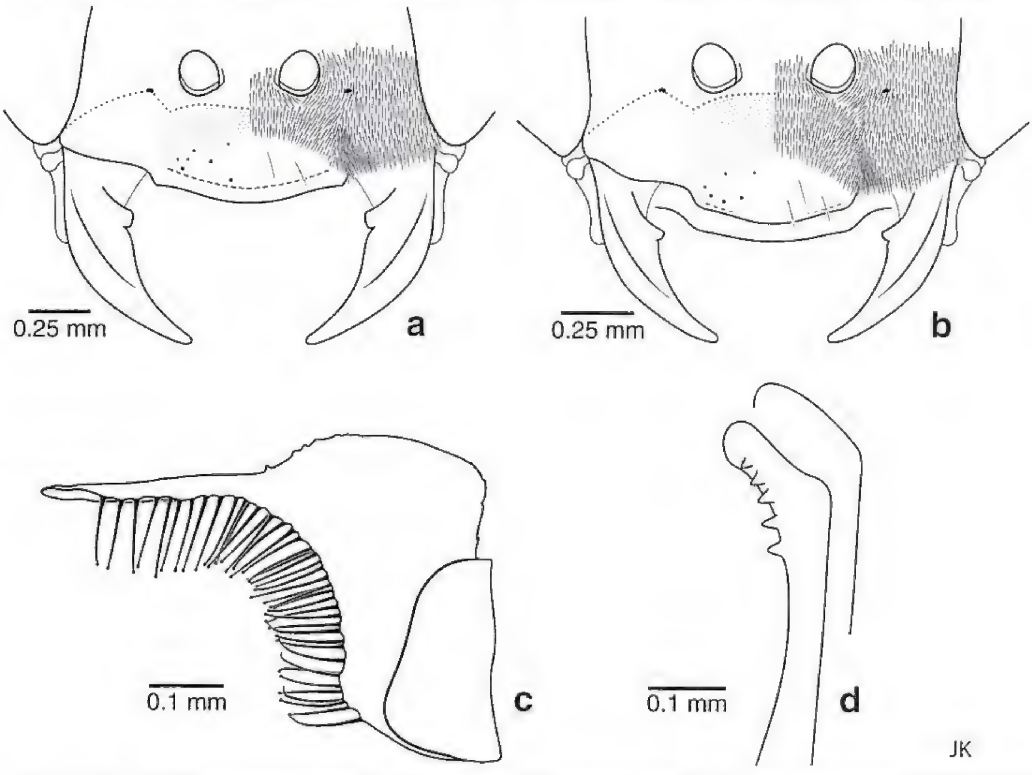


FIGURE 362. *Tachysphex speciosissimus* Morice: a – female clypeus and mandible; b – male clypeus and mandible with outline showing variation in width of clypeal lobe; c – volsella; d – penis valve with outline showing variation.

very in both sexes. Wing membrane nearly hyaline; costal vein of forewing yellowish, subcostal vein brown. Femora black except apically (hindfemur red in some females); tibiae and tarsi red except black in some males. Gaster varying from all red to all black in female, in male all black or terga I and II red; apical depression of terga translucent. Terga I–V (I–IV in many females) silvery fasciate apically.

♀.— Clypeus (Fig. 362a): bevel shorter to longer than basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 1.5–1.7 × length. Dorsal length of flagellomere I 2.3–2.8 × apical width. Anteroventral surface of fore- and midfemora near base shiny and with a few, large punctures. Venter of trochanters I–III shiny, with a few, sparse punctures. Dorsal foretibial surface with one or two spines; outer surface with 1–3 spines. Forebasitarsus with 6–8 rake spines. Apical spines of hindtarsomere IV, in some females, nearly reaching claw bases. Apical tarsomeres with several erect spines on venter. Apical depression of tergum V mostly setose, but glabrous in holotype of *redivivus* and in specimen from Wadi Digla, Egypt. Pygidial plate with punctures that average many diameters apart; interspaces aciculate, unsculptured near apex in some specimens. Length 5.6–11.1 mm.

♂.— Mandible: trimmal carina with obtuse tooth, without cleft (Fig. 362b). Clypeus (Fig. 362b): bevel about as long as basomedian area; lip indistinctly separated from bevel, its free margin arcuate, with corner; distance between corners 1.1–1.5 × distance between corner and orbit. Width of postocellar area 2.1–2.5 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width. Forefemoral notch asetose. Outer margin of forebasitarsus with four rake spines; outer apical spine of foretarsomere II as long as tarsomere III or longer. Sterna II–IV, in most specimens, sparsely punctate and setose from base to apex on broad, median zone (sparsely punctate zone nearly reduced in males from Pakistan). Sternum VIII shallowly emarginate apically, apical margin nearly straight between lateral prongs. Length 5.0–7.3 mm. Volsella and penis valve: Figs. 362c, d.

Geographic distribution (Fig. 363).— Mauritania, North Africa, Israel, Syria, Iran, Pakistan.

Records.— **ALGERIA**: Biskra (Pulawski, 1971). **EGYPT**: **Al Jizah** (= Ghiza): Kafr Hakim in Embabah (de Beaumont, 1940), Wadi um Assaad near Abu Rawash (de Beaumont, 1940). **Al Qahirah** (= Cairo): Cairo (Kohl, 1901), Kubbah (Morice, 1897), Maadi (Pulawski, 1971), Wadi Digla (1 ♀, USNM), Wadi el Tih (1 ♂, NHMW). **As Suways** (= Suez): Ain Sokhna (Pulawski, 1971), 13–22 km N Ain Sokhna (1 ♂). **Sina** (= Sinai): Wadi Gharandal 30 km NW Abu Zenima (1 ♀, 1 ♂), Wadi Sudr 50 air km SE Suez

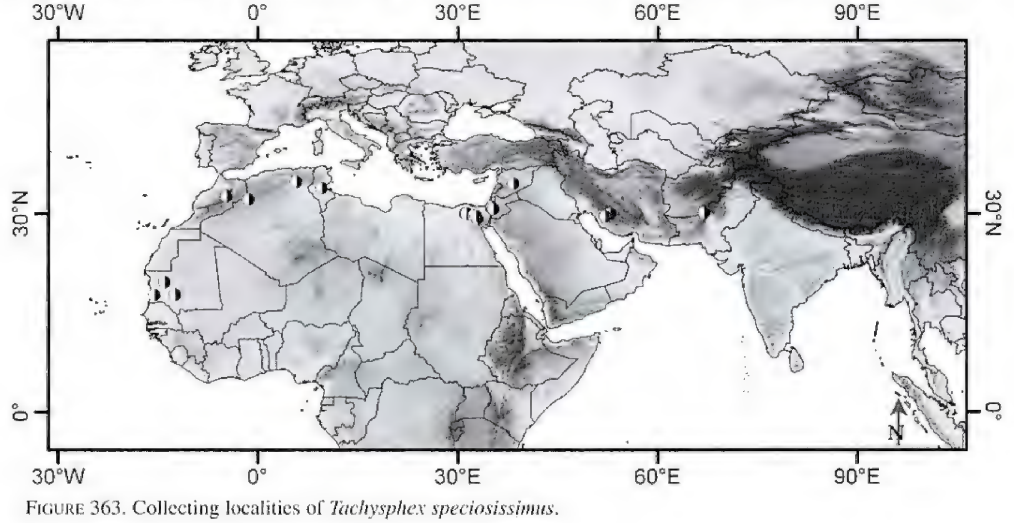


FIGURE 363. Collecting localities of *Tachysphex speciosissimus*.

(1 ♀, 1 ♂). **IRAN**: **Fars**: 5 km N Persepolis (1 ♀), Zenjun 40 km W Shiraz (Pulawski, 1971). **ISRAEL**: Arava Valley at 30°42.9′N 35°11.2′E (1 ♀, CSE), Arava Valley: Hazeva (1 ♀), Arava Valley: Shizaf Nature Reserve (2 ♀), Bir Rehme = Kfar Yeroham 30 km SSE Beersheba (1 ♂), Kurnub (1 ♂), Mamshit (de Beaumont, Bytinski-Salz, and Pulawski, 1973), Nakhal Zin at En Akrabim (1 ♀). **MAURITANIA**: Akjoujt-Trevia at 19°36′N 14°03′W (1 ♂), 25 km SW Moudjéria (1 ♀), 60 km SE Nouakchott (1 ♀). **MOROCCO** (Pulawski, 1971): Defilia near Figuig, Midelt. **PAKISTAN**: Quetta (1 ♂; 1 ♂, BMNH). **SYRIA**: **Homs**: Palmyra (4 ♀). **TUNISIA**: 60 km W Gabes (1 ♂, MS). **Location unknown**: Poure Orophos (Pulawski, 1971).

Tachysphex spectrum Pulawski, sp. nov.

Figures 364, 365.

Derivation of name.— *Spectrum*, Latin for ghost, an allusion to the sporadic occurrence of this species; a noun in apposition to the generic name.

Recognition.— *Tachysphex spectrum* is all black, with infumate wings, and a punctate supraantennal swelling (although slightly less densely than the adjacent frons). Both sexes can be recognized by the above characters in combination with the unridged propodeal side. Additionally, the female tarsi are somewhat shortened, with midtarsomere II less than twice as wide as long, and the pygidial plate is densely punctate (Fig. 364c); in the male, the apical (dentate) portion of the penis valve is broadened basally (Fig. 364e). Some males of *harpax* are externally similar, but they have two to several spines on the venter of apical tarsomeres. Only one preapical spine is present in the male of *spectrum*.

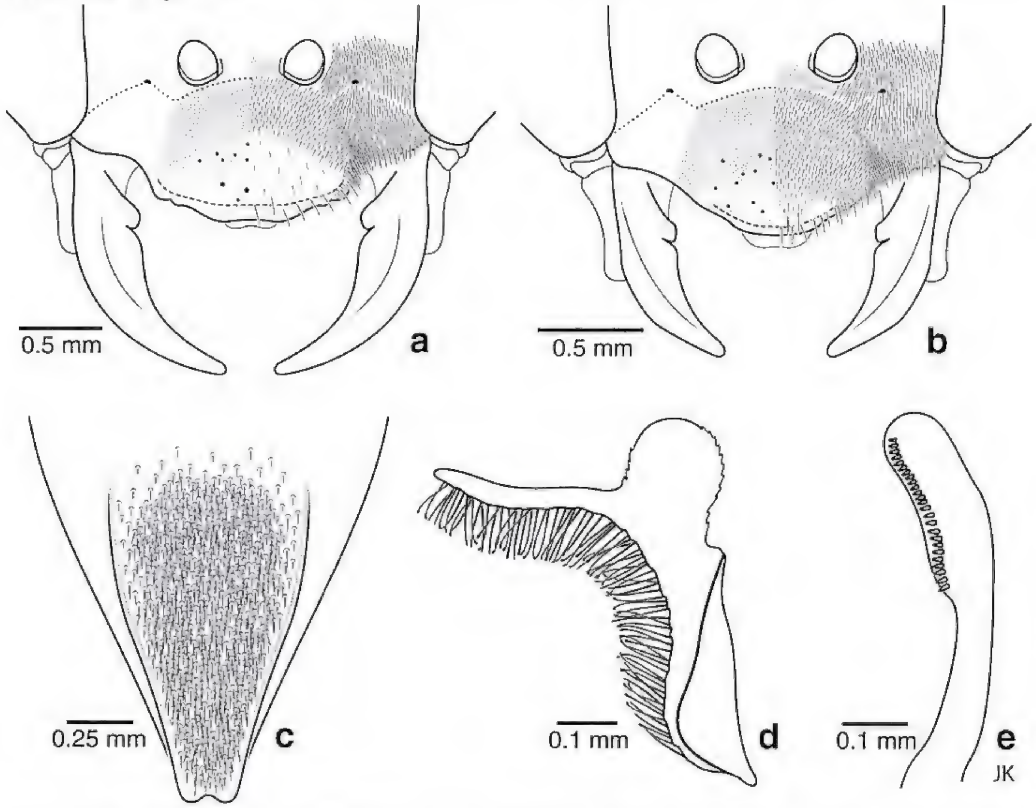


Figure 364. *Tachysphex spectrum* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – pygidial plate of female; d – volsella; e – penis valve.

Description.— Supraantennal swelling minutely punctate, although slightly less densely than surrounding area. Scutal punctures minute, about one diameter apart; interspaces dull. Mesopleural punctures minute, about 2–3 diameters apart; interspaces microsculptured, dull. Propodeal dorsum evenly microareolate; side microscopically punctate. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; suberect on each side of oral fossa next to occipital carina, about as long as midocellar diameter; oriented posterad on propodeal dorsum.

Head, thorax, legs, and gaster black, mandible dark reddish mesally, tarsal apex dark brown. Frontal setae silvery in both sexes. Wing membrane infumate; costal vein of forewing dark brown, subcostal vein black. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 364a): middle section (except bevel) with dense, minute and large, sparse punctures; bevel shorter than basomedian area; lip free margin arcuate, incised laterally. Width of postocellar area 1.0–1.3 × length. Dorsal length of flagellomere I 1.5–1.7 × apical width; flagellomeres III–IX with ill-defined sensory areas. Dorsal foretibial surface with one spine; outer surface with two bristles. Tarsi short: length of fore- and midtarsomeres II about 1.1–1.3 and 1.8 × apical width, respectively; of midtarsomere III 1.3 × apical width; of fore-, mid-, and hindtarsomeres IV about 0.9, 0.9, and 1.0 × apical width, respectively. Forebasitarsus with 11 rake spines. Apical tarsomeres with preapical spines on venter (spines inconspicuous in female from Tanzania). Apical depression of tergum V punctate and setose throughout. Pygidial plate shallowly emarginate apically, densely punctate (punctures less than one diameter apart except anterolaterally), some punctures elongate (Fig. 364c). Length 9.9–10.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 364b): middle section (except bevel) with dense, minute and large, sparse punctures; bevel ill defined, markedly shorter than basomedian area; lip free margin arcuate, with ill-defined corner; distance between corners 1.2 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.3–1.5 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical rake spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length of midtarsomere II 2.1 × apical width, that of midtarsomere III 1.5 × apical width, that of midtarsomere IV about equal to apical width. Venter of tarsomeres V with one preapical spine. Apical margin of sternum VIII with obtuse median point. Length 8.3–10.0 mm. Volsella and penis valve: Figs. 364d, e.

Geographic distribution (Fig. 365).— Kenya, Tanzania.

Records.—Holotype: ♀, **TANZANIA: Morogoro Region**: 128 road km NW Morogoro at 6°08.2′S 36°54.3′E, 5 Jan 2003, WJP (CAS). Paratypes: **KENYA: Coast Province**: Voi area, 22 Nov–2 Dec 1996, Mi. Halada (1 ♀, 1 ♂, OÖLM). **TANZANIA**: same data as holotype except collected by M.A. Prentice (1 ♂).

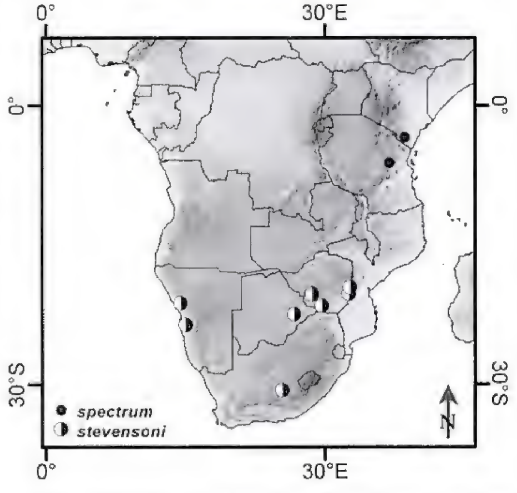


Figure 365. Collecting localities of *Tachysphex spectrum* and *stevensoni*.

***Tachysphex stevensoni* Arnold**

Figures 365, 366.

Tachysphex stevensoni Arnold, 1924:64, ♀, ♂ (as *Stevensoni*, incorrect original capitalization). Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed).

LECTOTYPE SELECTION.— Arnold designated a female and a male as types of *stevensoni*. I have selected the female as the lectotype, and the male as the paralectotype.

RECOGNITION.— The female of *stevensoni* has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate (almost straight), apicoventral margin roundly prominent mesally; tarsomeres V angulate basoventrally, each with a central cluster of small spines on the venter, and the apicoventral margin produced into a lobe; and on each leg one claw is smaller than the other. It can be distinguished from other such species by the red legs, a bicolored gaster (black basally, red apically), and setae of the propodeal dorsum (all or nearly all) inclined anterad. The flattened scutum and scutellum and well-defined mesopleural punctures are additional recognition characters.

The male is characterized by the following combination: trimmal carina nondentate (Fig.

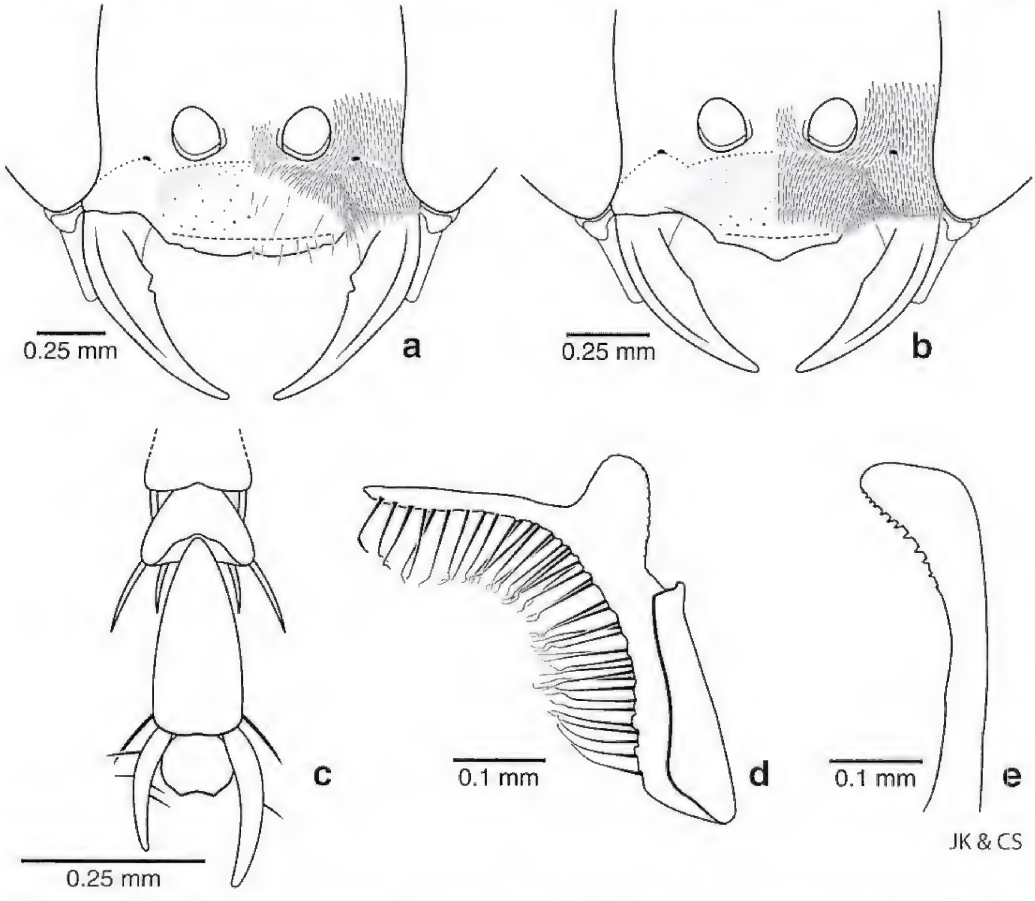


FIGURE 366. *Tachysphex stevensoni* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – female hindtarsomeres IV and V in dorsal view; d – volsella; e – penis valve.

366b), mesopleural punctures well defined, foretarsomere without preapical rake spines, length of tarsomeres IV equal to apical width or slightly less, legs red, gaster black with red tip (possibly all black in some specimens), and setae of the propodeal dorsum inclined anterad. A minute, preapical spine on the venter of each apical tarsomere helps in recognition.

Description.— Scutal punctures well defined, averaging 2–3 diameters apart on disk in female, less than one diameter in male. Mesopleural punctures well defined, slightly more than one to several diameters apart beneath scrobe, interspaces unsculptured. Punctures of mesothoracic venter several diameters apart in female, about one diameter apart in male. Propodeal dorsum irregularly ridged longitudinally (ridges evanescent posteriorly in some specimens), side ridged. Hindcoxal dorsum with inner margin carinate, carina expanded basally.

Setae appressed on postocellar area and scutum; about 0.2 × basal mandibular width on each side of oral fossa next to occipital carina; oriented anterad on propodeal dorsum (oriented posterad at the very apex of dorsum in lectotype female).

Head and thorax black, mandible reddish mesally. Frontal setae silvery in female, golden in male. Wing membrane hyaline; forewing costal vein yellowish brown, subcostal vein brown. Femora, tibiae, and tarsi red. Gaster black except apical segments red (IV–VI in female, V–VII to VII alone in male). Terga I–III in female, I–IV or I–V in male, silvery fasciate apically (fasciae broadly interrupted mesally in female).

♀.— Labrum: free margin emarginate mesally. Clypeus (Fig. 366a): bevel longer than basomedian area, but not sharply delimited; lip free margin arcuate, not emarginate mesally, with two rudimentary, lateral incisions on each side. Width of postocellar area 1.0 × length. Dorsal length of flagellomere I 2.0–2.4 × apical width. Scutum and scutellum flattened. Midtrochanteral venter impunctate. Forefemoral venter: punctures several diameters apart. Dorsal foretibial surface with minute suberect, inconspicuous bristles; outer surface glabrous, with a few inconspicuous bristles. Forebasitarsus with nine rake spines, two spines near midlength markedly shorter than others. Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, obtusely, broadly emarginate (Fig. 366c), with apicoventral margin obtusely, triangularly projecting; outer margin of foretarsomere IV about 0.5 × length of inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; lateral margins each with row of small spines; apicoventral margin produced into lobe. Outer claws of mid- and hindtarsi shorter, thinner than inner claws (opposite on foretarsus). Apical depression of tergum V unsculptured, glabrous. Pygidial plate with punctures that are several diameters apart, interspaces unsculptured. Length 7.0–8.8 mm.

♂.— Mandible: trimmal carina without tooth or cleft. Clypeus (Fig. 366b): bevel rudimentary; lip free margin pointed mesally, shallowly concave on each side of midpoint; corner well defined; distance between corners 0.8–0.9 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.3–1.5 × apical width, equal to 0.7 of II. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Length of tarsomeres IV equal to apical width or slightly less. Tarsomeres V each with minute, preapical spine on venter. Length 6.0–7.0 mm. Volsella and penis valve: Figs. 366d, e.

Geographic distribution (Fig. 365).— Namibia, Botswana, Zimbabwe, South Africa.

Records.— **BOTSWANA**: Serowe: Farmers Brigade (1 ♂, PPRI). **NAMIBIA**: **Khorixas District**: Hungorob Ravine mouth (2 ♂, SAM, determined as Species 4 by van Noort, Prinsloo, and Compton, 2000). **Swakopmund District**: Kuiseb River near Gobabeb (1 ♀, ♂; 1 ♀, 2 ♂, PPRI). **SOUTH AFRICA**: **Northern Cape Province**: VanWyksfontein 8 km W Norvalspont (1 ♀, AMG). **ZIMBABWE**: Bulawayo (4 ♀, 2 ♂, SAM, including lectotype, paralectotype, and 2 ♀ paratypes of *stevensoni*), Chipinga (1 ♂, SAM), Hope Fountain (2 ♂, SAM, paratypes of *stevensoni*; 1 ♂, TMP), Penkridge (2 ♂, SAM), Tshitona River (1 ♀, SAM).

***Tachysphex suavis* Arnold**
Figures 367, 368.

Tachysphex suavis Arnold, 1929:385, ♀. Holotype: ♀, Zimbabwe: Bulawayo (SAM), examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae), 1945:97 (Madagascar); Leclercq, 1961:109 (Madagascar); Bohart and Menke, 1976:277 (listed); Leclercq, 1990:118 (Madagascar); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Recognition.— The female of *suavis* has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate (almost straight) and the apicoventral margin roundly prominent mesally; tarsomeres V angulate basoventrally, with a row of small spines on each lateral margin and apicoventral margin produced into a lobe; and on each leg one claw is shorter than the other (Fig. 367c). Unlike most other such species, *suavis* has only 5–7 rake spines on the forebasitarsus (of which only the apical two have their sockets confluent), and three rake spines on foretarsomere II (one adapical, two apical, the latter two with their sockets confluent or adjacent). The eastern South African *agilis*, the West African *silvestris*, and the Madagascan *subcoriaceus* have a similar rake structure (also several extralimital species), but *suavis* differs in having scutal punctures of two discrete sizes (denser small punctures interspersed with sparser large punctures), a wide postocellar area (width 1.5–1.6 × length), and setae of the propodeal dorsum oriented anterad on a basal triangular area. In the other three species, scutal punctures are of equal size or nearly so, the postocellar area is narrower (width 1.1–1.3 × length), and setae of the propodeal dorsum are all uniformly erect or slightly inclined posterad. Also, the pygidial plate of many *suavis* is punctatorugose or with punctures nearly contiguous (but many punctures are several diameters apart in some specimens, as in *agilis*, *silvestris*, and most *subcoriaceus*).

The male of *suavis* can be recognized by the presence, in the apical portion of tergum VII, of a lateral, obtuse carina (and therefore a rudimentary pygidial plate). The following combination is also diagnostic: forebasitarsus with one to several preapical spines on the outer margin and apicolateral spine of foretarsomere II shorter than tarsomere III; clypeal lobe corners closer to each other than to the respective orbit (Fig. 367b); and setae subappressed on scutum, oriented posterad on propodeal dorsum (except oriented anterad on basomedian triangular area). In addition, scutal punctures in many specimens are of two sizes, as in the female, although the difference is slight.

Description.— Scutal punctures: in female, minute punctures that average 1–2 to several diameters apart on disk are interspersed with large punctures that are many diameters apart; in male, smaller discal punctures average 1–2 diameters apart (several diameters apart in single male from Zagnanado, Benin), and larger punctures are absent or less well defined than in female. Scutellum and postscutellum shiny. Mesopleural punctures minute, about 2–3 diameters apart at center, interspaces microareolate or aciculate. Punctures of mesothoracic venter about one diameter apart near midline, up to several diameters apart near signum. Propodeal dorsum irregularly rugose to irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate, carina somewhat expanded basally.

Setae erect on postocellar area, inclined adjacent to hypostomal carina (and somewhat longer than midocellar diameter), subappressed on scutum; on propodeal dorsum oriented posterad or posteromesad, but oriented anterad on large basomedian area.

Head, thorax, legs, and gaster black but mandible reddish (black basally and apically) and tarsal apex brown reddish (hindfemoral apex, all tibiae, and all tarsi red in some males). Frontal setae silvery in both sexes. Wing membrane slightly infumate, nearly hyaline; forewing costal vein brown, subcostal vein dark brown, almost black. Terga I–IV or I–V silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 367a): middle section slightly convex, bevel

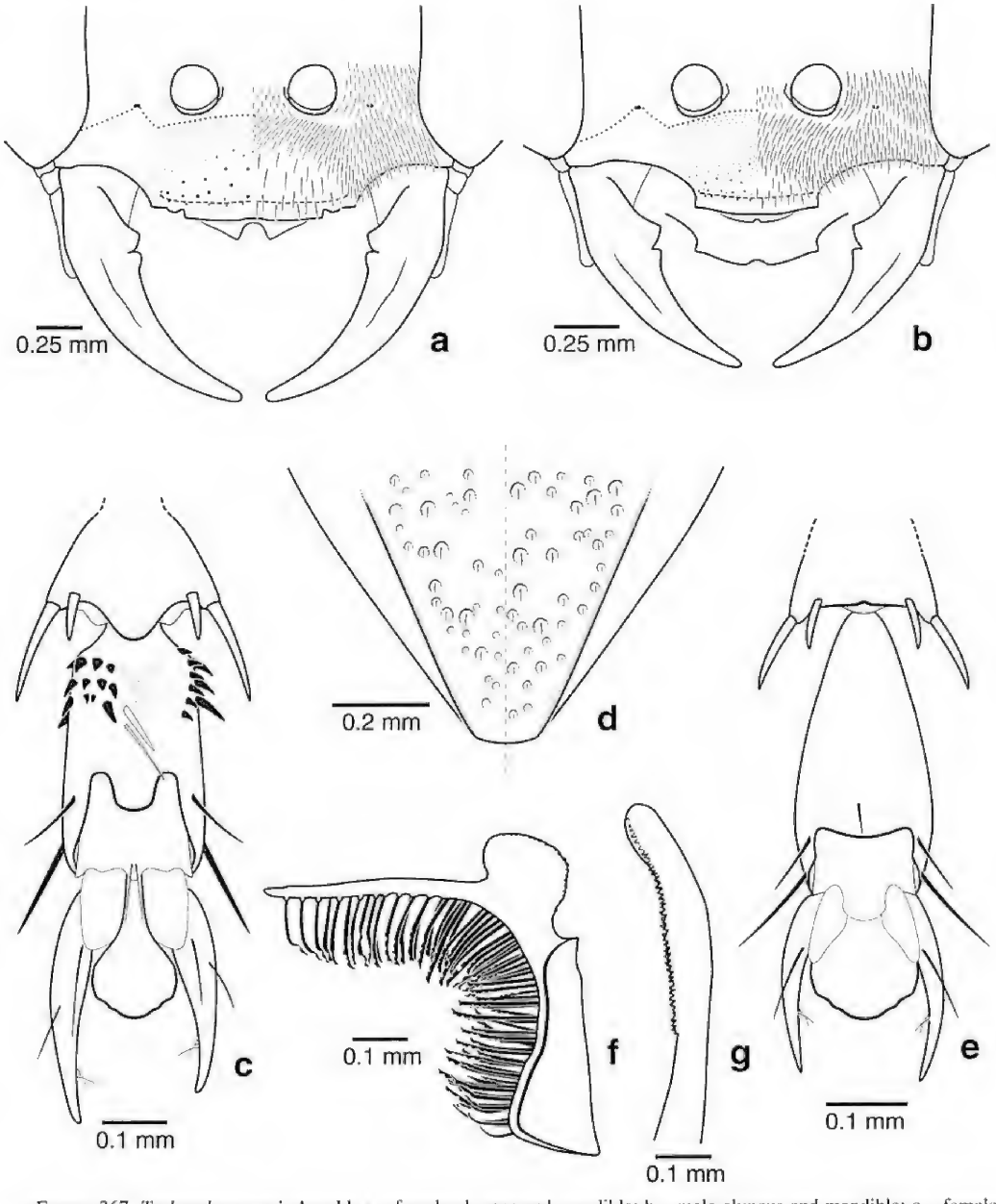


FIGURE 367. *Tachysphex suavis* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – female hindtarsomeres IV and V in ventral view; d – pygidial plate of female; e – male hindtarsomeres IV and V in ventral view; f – volsella; g – penis valve.

longer mesally than basomedian area; lip slightly arcuate or biarcuate, emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.5–1.6 × length. Dorsal length of flagellomere 1 2.3–2.4 × apical width. Scutum and scutellum flattened. Midtrochanteral venter with sparsely punctate area (punctures several diameters apart). Forefemoral venter with minute punc-

tures that average several diameters apart and large punctures that are many diameters apart. Dorsal foretibial surface with several suberect, inconspicuous bristles; outer surface impunctate, glabrous, with a few bristles. Forebasitarsus with 5–7 rake spines (only two apical spines with sockets confluent), foretarsomere II with three rake spines (one adapical, two apical), apical two with sockets confluent or adjacent. Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical emargination widely obtuse (almost straight) and apicoventral margin obtusely triangularly projecting; outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres V angulate basoventrally, with venter shallowly concave, with group of small spines basolaterally but no central cluster of such spines; each lateral margin with row of small spines (markedly smaller on inner side, opposite on foretarsus); apicoventral margin produced into lobe (Fig. 367c). Outer claws of mid- and hindtarsi shorter but not thinner than inner claws (Fig. 367c), inner claw shorter on foretarsus. Apical depression of tergum V largely impunctate and glabrous or punctate only basomedially. Pygidial plate punctatorugose or punctate (Fig. 367d). Length 7.9–12.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 367b): bevel shorter than basomedian area or absent; lip free margin almost straight or with shallow median notch, with well-defined corner; distance between corners 0.8–0.9 × distance between corner and orbit. Width of postocellar area 1.5 × length. Dorsal length of flagellomere I 1.8 × apical width. Forefemoral notch large, its bottom microscopically setose, slightly margined both anteriorly and posteriorly. Outer margin of forebasitarsus with 3–5 rake spines, but with only one preapical spine (at about tarsomere midlength) in single male from Tiwi Beaches, Kenya; outer apical spine of foretarsomere II shorter than tarsomere III. Venter of apical tarsomeres with preapical cluster of small spines in most specimens, but without such spines in those from Ivory Coast and Togo; apicoventral margin arcuate (Fig. 367e). Tergum VII posteriorly with obtuse carina adjacent to lateral margin, thus with rudimentary pygidial plate. Length 8.3–9.5 mm. Volsella and penis valve: Figs. 367f, g.

Prey.— A female from Madagascar (MNHN) is pinned with an immature cockroach, presumably her prey.

Geographic distribution (Fig. 368).— Senegal to South Africa, Madagascar.

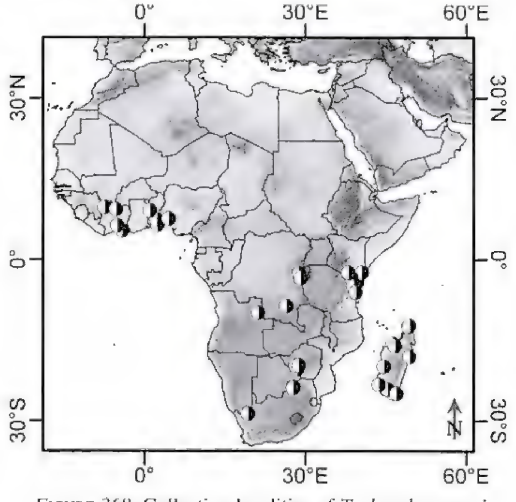


Figure 368. Collecting localities of *Tachysphex suavis*.

Records.— **ANGOLA**: **Lunda**: Murieje (1 ♀). **BENIN**: Cotonou (1 ♀, 1 ♂, ZMAN), Zagnanado (1 ♂, OÖLM). **IVORY COAST**: Adiopodoumé (1 ♀, KMG), Bouaké: Foro-foro (1 ♀; 1 ♀, UCD), Lamto (1 ♂, MNHN), 56 km N Niakaramandougou (1 ♂). **KENYA**: **Coast Province**: 30 km S Mombasa (1 ♂), Tiwi Beaches at 4°14′S 39°36′E (1 ♂, ZMUC), Uchweni Forest near Witu at 2°24′S 40°28′E (1 ♀, BMNH), Voi area (1 ♀, 1 ♂; 3 ♀, 4 ♂, OÖLM), about 1 km SE Voi (6 ♀). **Eastern Province**: Kibwezi (1 ♀, BMNH). **MADAGASCAR**: **Antsiranana**: Parc National Montagne d'Ambre at 12°31′S 49°11′E (1 ♂), 1 km W Sakalava Beach (1 ♂), 3 km W Sakalava Beach (1 ♀). **Mahajanga**: Amborovy 8 km NE Mahajanga (9 ♀, 2 ♂), Marovoay (1 ♀, MHNB). **Toamasina**: Toamasina (5 ♀, 17 ♂, MRAC). **Toliara**: Behara (1 ♀, MNHN), Bekily (1 ♀, MNHN; 2 ♀, SAM), 50 km NE Morondava (2 ♂; 1 ♂, MRAC), Tolanaro (Leclercq, 1990), Toliara (3 ♀, LB). **NAMIBIA**: **Karasburg District**: banks of Orange River near Onseepkans (1 ♀, BMNH). **NIGERIA**: Ile-Ife (1 ♂, FSAG). **SENEGAL**: Bayakh 48 km E Dakar (1 ♀).

SOUTH AFRICA: **Northern Province**: D'Nyala Nature Reserve (1 ♀, PPRI), Mogol Nature Reserve (2 ♂, PPRI). **TANZANIA**: **Tanga Region**: 10 km WNW Mabokweni (3 ♀). **Zanzibar Region**: Unguja (= Island of Zanzibar): no specific locality (1 ♂, MCZ). **TOGO**: 5 km W Sokodé (1 ♂). **ZAIRE**: **Shaba**: Mabwe at Lake Upemba in Upemba National Park (1 ♂, FSAG). **Sud-Kivu**: S Bukavu (1 ♀, BMNH), Uvira (1 ♂, BMNH). **ZAMBIA**: **Southern Province:** Katombora (1 ♀, SAM). **ZIMBABWE**: Bulawayo (1 ♀, SAM, holotype of *suavis*), Matobo (1 ♀, SAM), 11 km NE Nyamandhlovu (1 ♀), Turk Mine (1 ♀, SAM).

Tachysphex subcoriaceus Arnold

Figures 369–371.

Tachysphex subcoriaceus Arnold, 1945:98, ♂. Holotype: ♂, Madagascar: Ranomafana (MNHN), examined.— Leclercq, 1961:109 (description of ♀; Madagascar); Bohart and Menke, 1976:277 (listed); Leclercq, 1990:118 (Madagascar); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Tachysphex subeditus Leclercq, 1961:109, ♀, ♂. Holotype: ♂, Madagascar: Foulpointe, now Mahavelona (MHNB), examined. **New synonym.**— Bohart and Menke, 1976:277 (listed); Pulawski, 2003:798 (in checklist of Malagasy Sphecidae).

Recognition.— *Tachysphex subcoriaceus* is an endemic of Madagascar with an all black gaster. The female has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate (almost straight) and apicoventral margin obtusely projecting; tarsomeres V angulate basoventrally, with a central cluster of small spines on venter, a row of spines on the basal half of each lateral margin, and the apicoventral margin produced into a lobe (Fig. 369d); and on each leg one claw smaller than the other. Unlike its Malagasy congeners with such tarsi (*scaurus*, *suavis*), the female of *subcoriaceus* has all setae of the scutum and propodeal dorsum erect or slightly inclined posterad (rather than appressed on the scutum and oriented anterad on the propodeal dorsum, at least anteromesally), the scutellum convex (rather than flattened), and the propodeal dorsum slightly shorter than the scutellum and postscutellum combined (rather than slightly longer). Like *suavis* and unlike the other Malagasy species, the female has only five or six rake spines on the forebasitarsus, of which only the apical two have their sockets contiguous (Fig. 369c); additionally, foretarsomere II has only two rake spines (both apical, with confluent or adjacent sockets), whereas *suavis* has three. Unlike *suavis*, the scutal punctures are uniform in size on any given portion (small, dense punctures intermixed with large, sparse punctures in *suavis*).

The male of *subcoriaceus* can be recognized by the setae of the propodeal dorsum uniformly erect or slightly inclined posterad, in combination with a central cluster of small spines on the venter of apical tarsomeres (Fig. 369e), although spines may be difficult to see at first, and the distance between the clypeal lip corners equal to the distance between a corner and the adjacent orbit or greater (Fig. 369b). Most males have scutal setae erect or suberect (about one midocellar diameter long), and many have the black gaster combined with red tibiae, a subsidiary recognition feature.

Justification of new synonymy.— The holotype of *subeditus* differs from most males of *subcoriaceus* in having finely, uniformly punctate sterna, but this appears to be merely an individual variation (see Description below for details). Leclercq (1961) spoke of a differently shaped sternum VII in the holotype of *subeditus*, but I found no differences from *subcoriaceus* after having removed a gum-like deposit.

Description.— Scutum and mesopleuron dull, conspicuously microsculptured; scutal punctures up to several diameters apart in female, 1–2 diameters apart in male; mesopleural punctures minute, several diameters apart in female, 2–3 diameters in male. Episternal sulcus complete. Propodeal dorsum irregularly rugose to evenly microareolate, longitudinally ridged basally; side either ridged or with ridges evanescent in female; in male with evanescent ridges or evenly microsculptured. Hindcoxal dorsum with inner margin not carinate basally. Sternum I, in some

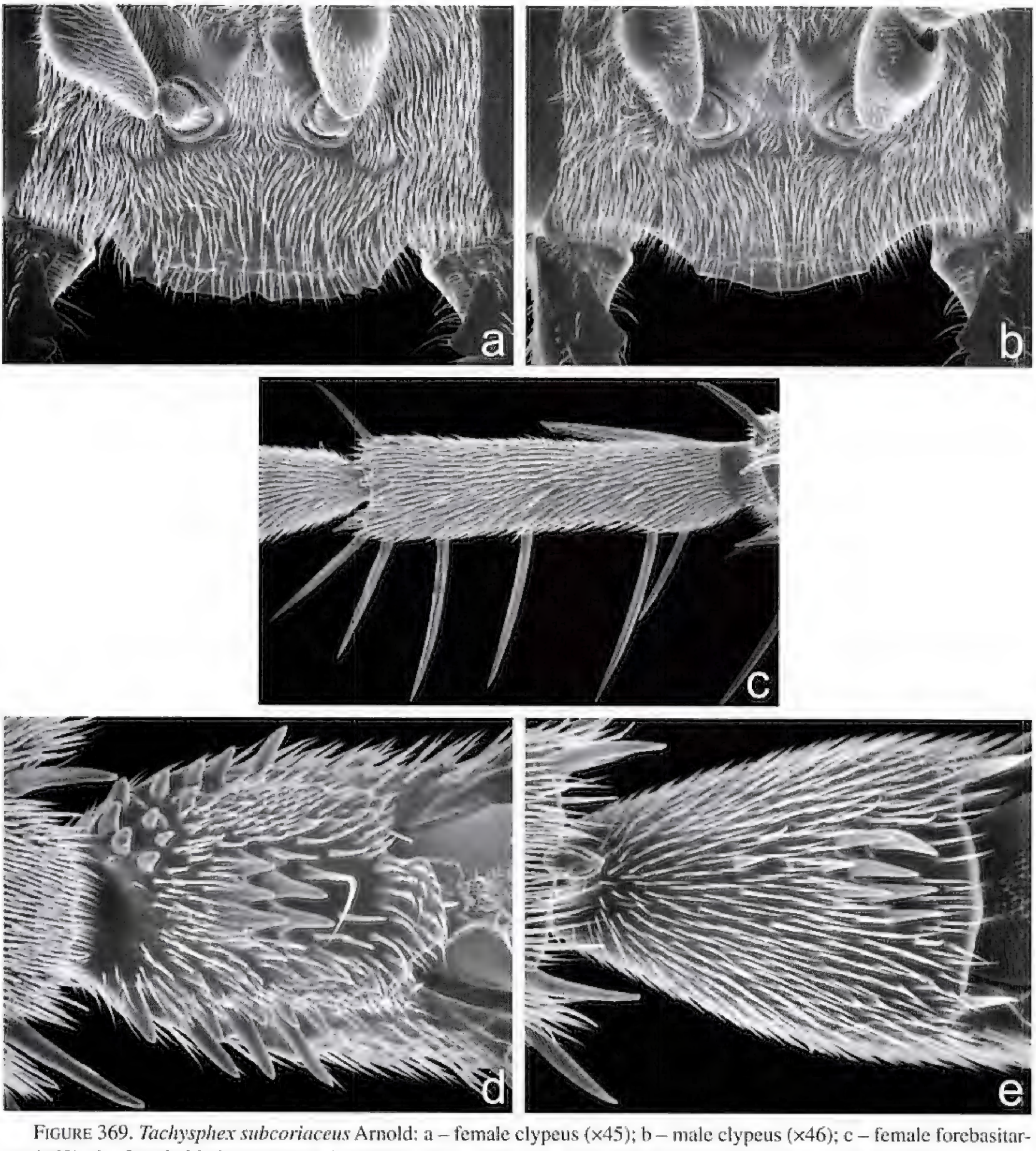


FIGURE 369. *Tachysphex subcoriaceus* Arnold: a – female clypeus (×45); b – male clypeus (×46); c – female forebasitarsus (×60); d – female hindtarsomere V in ventral view (×180); e – male hindtarsomere V in ventral view (×240).

specimens, with obtuse median carina.

Setae straight; erect, about 0.3 × basal mandibular width on postocellar area and on each side of oral fossa next to occipital carina; erect, about one midocellar long on scutum and midfemoral venter (scutal setae nearly appressed in one male from Tongobory); erect or slightly inclined posterad on propodeal dorsum.

Head, thorax, and gaster black, mandible reddish mesally. Frontal setae silvery in female, with golden tinge in male. Wing membrane nearly hyaline; forewing costal vein brown, subcostal vein black. Legs black in female except tarsal apex red or reddish; in male at least tibial apex and tarsi red (all tibiae and tarsi red in males from Isalo). Terga I–III silvery fasciate apically.

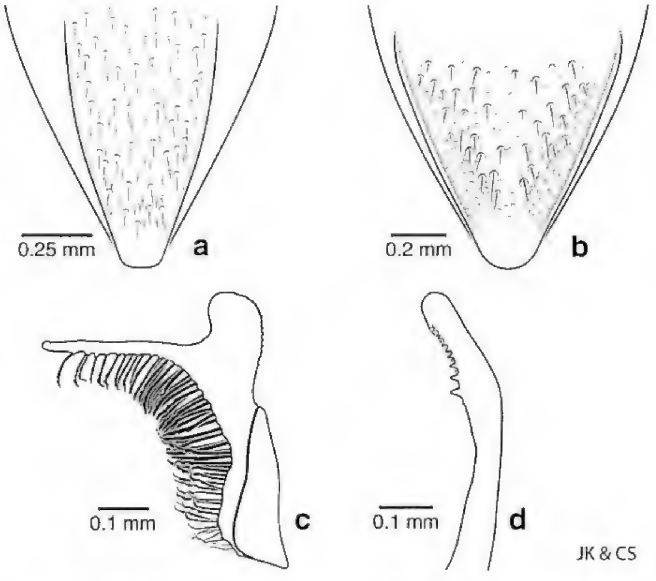


FIGURE 370. *Tachysphex subcoriaceus* Arnold: a – pygidial plate of average female; b – pygidial plate of female described by Leclercq (1961) as allotype of *subcoriaceus*; c – volsella; d – penis valve.

♀.— Labrum emarginate. Clypeus (Fig. 369a): middle section almost flat; bevel shorter than basomedian area to fully reduced; lip slightly arcuate (almost straight), emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.3–1.4 × length. Dorsal length of flagellomere I 2.0–2.1 × apical width. Forefemoral venter with minute punctures that are several diameters apart, interspaces dull, microsculptured. Dorsal foretibial surface with several inconspicous, suberect bristles; outer surface with two or three erect bristles. Forebasitarsus with five or six rake spines, of which only two apical ones have confluent sockets (Fig. 369c); foretarsomere II with two rake spines (both apical, with sockets confluent or adjacent). Tarsomeres III with apicoventral margin arcuate, foretarsomere III with inner and outer margin about equal in length. Tarsomeres IV wider than long, with dorsoapical margin widely emarginate, almost straight, and apicoventral margin obtusely prominent; outer margin of foretarsomere IV shorter than inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; lateral margin with row of spines in basal half, apicoventral margin produced into lobe (Fig. 369d). Outer claws of mid- and hindtarsi shorter, thinner than inner claws (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous. Pygidial plate, in most specimens, with scattered, well-defined punctures and unsculptured interspaces, but most punctures compressed or less than one diameter apart in female from Fampanambo that was described as allotype of *subcoriaceus* by Leclercq, 1961 (Figs. 370a, b). Length 9.6–10.5 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 369b): bevel rudimentary of absent; lip free margin slightly arcuate, with well-defined corner; distance between corners 1.0–1.2 × distance between corner and orbit. Width of postocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 1.4–1.6 × apical width. Forefemoral notch relatively large, with glabrous platform that is margined both anteriorly and posteriorly. Outer margin of forebasitarsus with 0–2 preapical rake spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with preapical cluster of small spines (Fig. 369e). Sternal punctures, in most specimens, becoming larger toward gastral apex, but uniformly fine in single males from Nosy-Komba and Mahavelona; and somewhat intermediate in single male from Antanambe. Sternum VIII evenly emarginate apically or with rudimentary prominence apicomesally, tridentate apically in holotype of *subcoriaceus*. Length 8.8–10.2 mm. Volsella and penis valve: Figs. 370c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 371).— Madagascar.

RECORDS.— MADAGASCAR: **Antsiranana**: Montagne des Français at 12°19′22″S 49°20′17″E (1 ♀), Nosy-Komba island near Nosy-Be (1 ♂, MNHN), Reserve Spéciale d'Ankarana 2.6 km E Andrafiabe

(2 ♀). **Fianarantsoa**: Isalo National Park at 22°36′S 45°10′E (2 ♀, 5 ♂; 2 ♀, 6 ♂, MSNT), Ranomafana (2 ♂, MNHN, including now headless holotype of *subcoriaceus*; 2 ♂, SAM, including paratype of *subcoriaceus*). **Mahajanga**: Amborovy 8 km NE Mahajanga (1 ♀), Katsepy (1 ♂, NHMW), Réserve d'Ankoririka 10.6 km NE Tsaramandroso at 16°16′02″S 46°02′55″E (2 ♀). **Toamasina**: Anosibe-Nord (Leclercq, 1960), Antanambe (1 ♂, MHNB), Fampanambo (1 ♀, 1 ♂, MHNB; 1 ♀, MRAC), Mahavelona (1 ♀ allotype of *subeditus*, 1 ♂ holotype of *subeditus*, MHNB; 1 ♂, MRAC). **Toliara**: Bereboka 60 km NE Morondava (1 ♀, BMNH), 50 km NE Morondava (1 ♀, 1 ♂; 4 ♀, 2 ♂, MRAC), 5 km N Toliara (1 ♀), Tongobory (1 ♀, 3 ♂, BMNH).

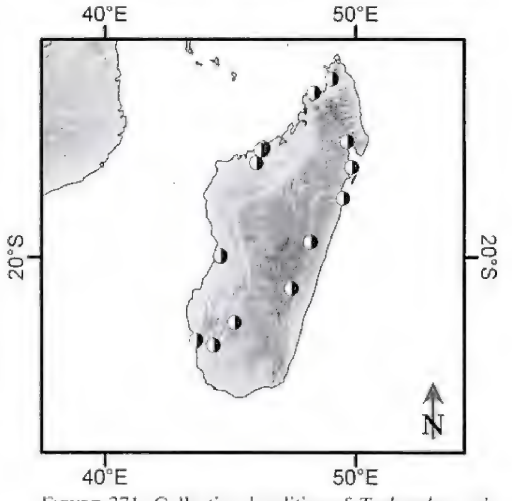


FIGURE 371. Collecting localities of *Tachysphex subcoriaceus*.

Tachysphex subfimbriatus Arnold

Figures 372–374.

Tachysphex subfimbriatus Arnold, 1924:69, ♀, ♂. Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (TMP), **here designated**, examined.—Arnold, 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed).

RECOGNITION.— *Tachysphex subfimbriatus* shares the following with *kalaharicus*: setae sinuous adjacent to the hypostomal carina, anteriorly on scutum (only slightly so in some females), and on propodeal dorsum; width of postocellar area smaller than length; mesopleuron punctate; propodeal side ridged; labrum flat, not protruding or slightly protruding beyond clypeal margin; hindwing crossvein cu-a vertical; apical tarsomeres of female not elongate, with apicoventral margin nearly straight. The female also resembles *scopa*, but unlike the latter species it has setae about as long as midocellar diameter on the midfemoral venter (markedly longer than that in *scopa*), mid- and hindtarsomeres III almost twice as long as wide apically (rather than 1.2–1.3 × apical width), dorsoapical emargination of tarsomeres IV acutely angulate (rather than roundly emarginate), apicoventral margins of the apical tarsomeres nearly straight (rather than roundly produced), and claws not elongate (arolium about half length of a claw rather than one third).

The female of *subfimbriatus* has the free margin of the clypeal lobe evenly arcuate (Fig. 372a), hindtarsomeres V without spines on the lateral margins, and the basal platform of sternum II broadly rounded (and with a sharp median point in some specimens). In *kalaharicus*, the clypeal free margin has a small median notch (Fig. 202c), hindtarsomeres V of most specimens have a spine on each lateral margin (Fig. 202e), and the basal platform of sternum II is wedge-shaped, acutely angulate (Fig. 202g).

In the male of *subfimbriatus*, sterna III–V each has a well-defined tuft of erect setae that emerge from a small, longitudinally elongate apicomedian area (Figs. 373c, d), a feature unique within the genus; the forefemoral notch is glabrous; foretarsomere I has three or four preapical rake spines (Fig. 373b); and the outer apical spine of foretarsomere II is as long as foretarsomere III. In *kalaharicus*, the erect apicomedian setae of sterna III–V emerge from a single transverse line (Figs. 203c, d), the femoral notch is setose, foretarsomere I has 0–3 preapical rake spines, and the outer apical spine of foretarsomere II is shorter than foretarsomere III.

DESCRIPTION.— Gena nearly absent in dorsal view (Fig. 372c). Scutal punctures coarse, averaging about one diameter apart in female, up to several diameters apart on disk in male. Mesopleural punctures less than one diameter apart in female, about one diameter apart in male.

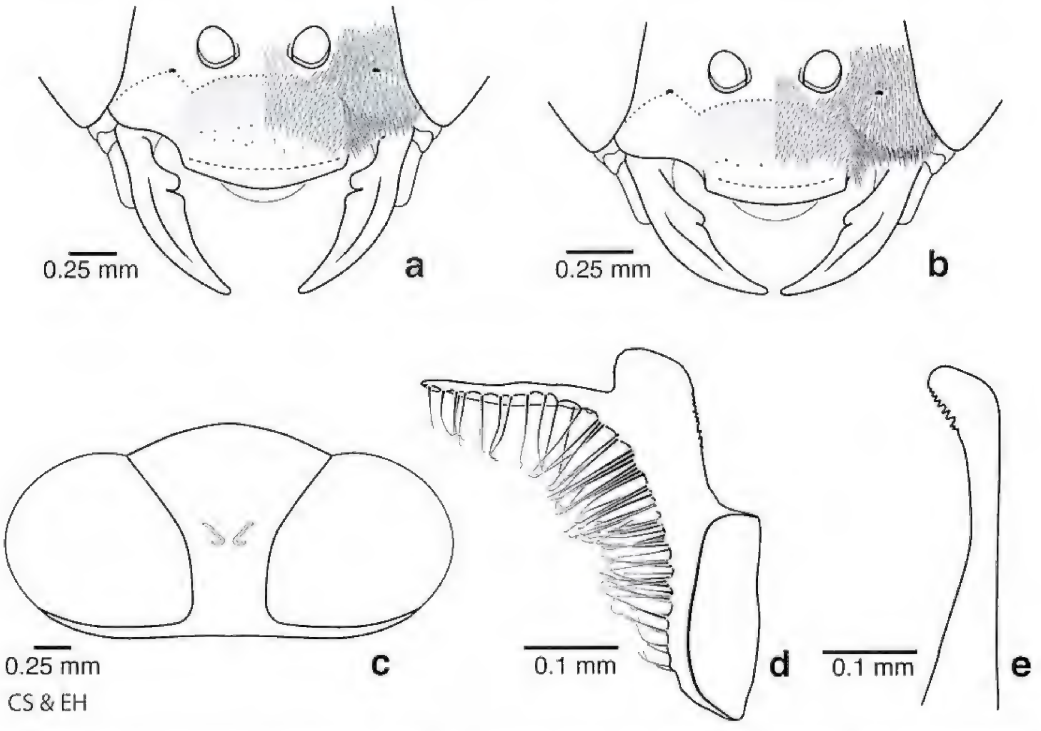


FIGURE 372. *Tachysphex subfimbriatus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – female head in dorsal view; d – volsella; e – penis valve.

Punctures of mesothoracic venter several diameters apart in most males. Propodeal dorsum irregularly ridged longitudinally, side ridged; posterior surface, in dorsal quarter or so, with wide median impression. Hindcoxal dorsum with inner margin carinate basally, carina not expanded.

Setae (numbers in parentheses refer to setal length expressed as a fraction of basal mandibular width): sinuous or curved on gena, postocellar area, and thorax; erect on each side of oral fossa next to occipital carina (up to 0.7–0.8); suberect on scutum anteriorly (up to 0.8); not obscuring mesopleural integument; oriented posterad on propodeal dorsum (0.6–0.7); erect or nearly so on male fore- (up to 0.7) and midfemoral venters, including several setae next to proximal margin of forefemoral notch.

Head and thorax black, mandible yellowish red mesally. Frontal setae silvery in female, golden in male. Wing membrane almost hyaline; forewing costal vein yellowish brown, subcostal vein brown. Femora black, red apically (distal half of hindfemur red in some females). Tibiae and tarsi red. Gastral segments I–III of female red, pygidial plate reddish, remainder black; male gaster red, but only segments I and II and base of III red in one specimen (remainder black). Terga I–III in female, I–IV in male, silvery fasciate apically.

♀.— Clypeus (Fig. 372a): bevel shorter than basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.9–2.0 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with six or seven rake spines. Venters of hindtarsomeres V each with several spines of various thickness, of which two are subbasal and the remaining preapical. Apical depression of tergum V unsculptured, asetose. Pygidial plate rounded apically. Length 7.2–8.9 mm.

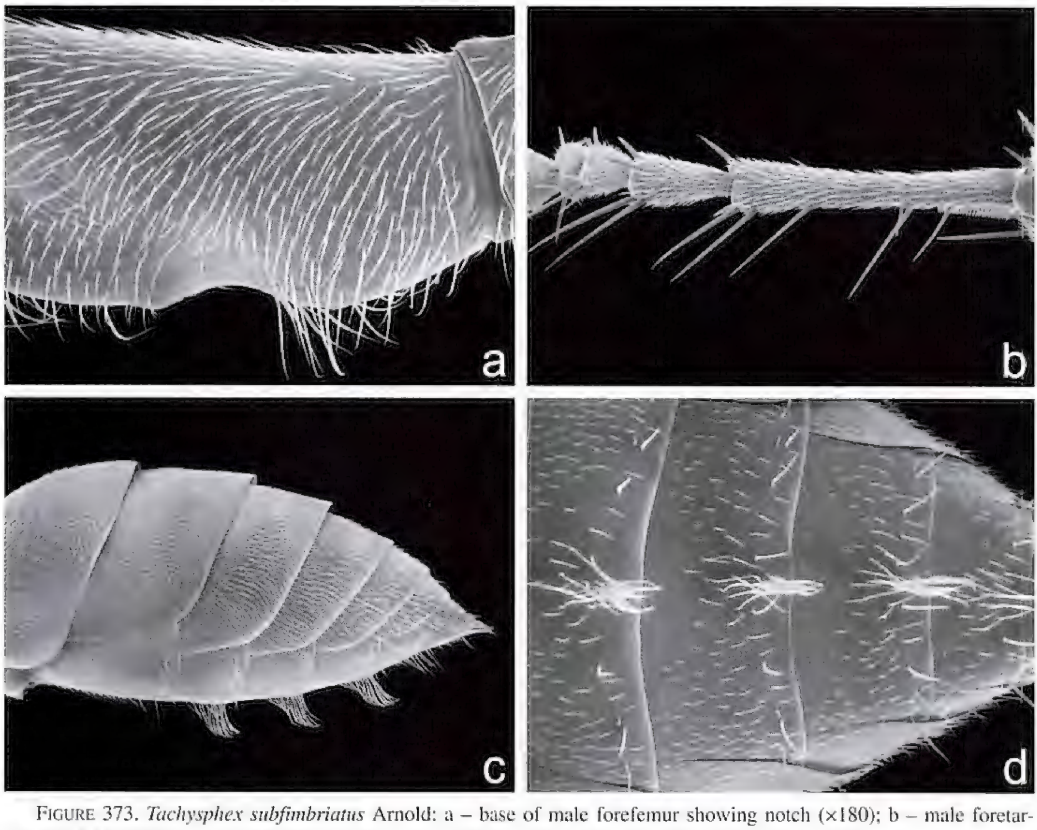


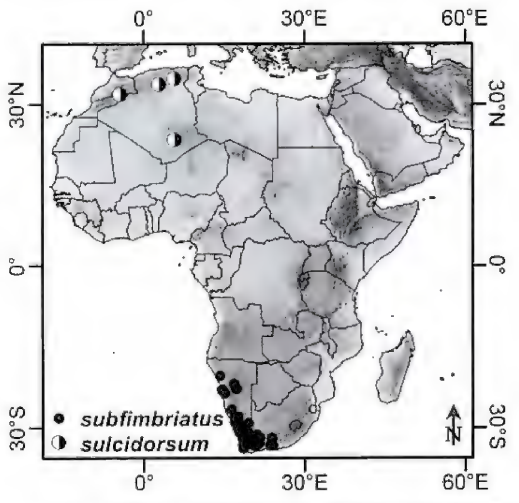
FIGURE 373. *Tachysphex subfimbriatus* Arnold: a – base of male forefemur showing notch (×180); b – male foretarsomeres I–IV (×93); c – male gaster in lateral view (×36); d – male sterna III–VI in ventral view (×72).

♂.— Mandible: trimmal carina with small tooth and cleft. Clypeus (Fig. 372b): bevel longer than basomedian area; lip free margin arcuate, with well-defined corner; distance between corners 1.4–1.5 × distance between corner and orbit. Width of postocellar area 0.3–0.8 × length. Dorsal length of flagellomere I 1.7–1.8 × apical width. Forefemoral notch glabrous (Fig. 373a). Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III (Fig. 373b). Venter of hindtarsomere V with thin, preapical spine. Sterna III–VI largely impunctate and glabrous, each with apicomedian tuft of dense, erect setae that emerge from small, longitudinally elongate area (Figs. 373c, d); setal length about 0.5 × basal mandibular width. Length 4.1–9.0 mm. Volsella and penis valve: Figs. 372d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 374).— Namibia, South Africa east to about 24°E.

RECORDS.— **NAMIBIA**: **Karasburg District**: Ai Ais on Fish River (1 ♂, FSCA). **Khorixas District**: 120 km from Khorixas on road to Palm (1 ♂). **Lüderitz District**: Aus (1 ♂, BMNH), 16 km S Rosh Pinah (1 ♂, AMG). **Okahandja District**: Waldau River 17 km W Okahandja (1 ♀). **Swakopmund District**: Kuiseb River near Gobabeb (1 ♀, PPRI), Kuiseb River 20 km NW Gobabeb (2 ♂, FSCA). **Walvis Bay District**: Kuiseb River Delta near Rooibank (2 ♂, PPRI), Rooibank (3 ♀, 2 ♂, AMG), Walvis Bay (2 ♂, MS). **Windhoek District**: Aris 25 km S Windhoek (2 ♀, 1 ♂; 3 ♀, MS), 2 km S Aris (1 ♀, 1 ♂). **SOUTH AFRICA**: **Eastern Cape Province**: Elandsheuwels Farm 40 km W Steytlerville (1 ♀, 1 ♂, USU), Willowmore (1 ♀, 1 ♂, SAM, paratypes of *subfimbriatus*; 2 ♀, 2 ♂, TMP, including lectotype and paralectotype of *subfimbriatus*), 9 km E Willowmore (2 ♀, 2 ♂). **Northern Cape Province**: 58 km S Alexander Bay at 29°02′S 16°49′E (1 ♂, AMG), Anenous in Namaqualand at 29°15′S 17°35′E (2 ♀, AMG), W Calvinia (2 ♂, OÖLM),

Fraserburg (1 ♂, AMG), 40 km SW Garies (1 ♂, OÖLM), Groen River 40 km SW Garies (1 ♀, OÖLM), 25 km E Hondeklipbaai (2 ♂, OÖLM), SW Loeriesfontein (1 ♂, OÖLM), Pofadder (1 ♀, SAM), SW Springbok (1 ♀, OÖLM), Steinkopf (1 ♂, FSCA), Tanqua-Karoo National Park (1 ♀, 1 ♂, SAM), Voëlklip at 29°45′S 17°22′E (1 ♂, AMG), 5 km E Williston (4 ♀, AMNH). **Western Cape Province**: Cape Town: Milnerton (2 ♂, BMNH), 50 km N Cape Town (1 ♀, 2 ♂, OÖLM), 60 km N Cape Town (1 ♀, 6 ♂, OÖLM), Cederberg (1 ♂, RMNH), 20 km N Citrusdal (1 ♂, OÖLM), Clanwilliam (2 ♂, FSCA), 11 km W Clanwilliam: Ysterfontein Farm (1 ♂, USU), Dikbome Farm on Merweville-Koup road (1 ♀, SAM), Doringbos at 31°58′19″S 19°13′33″E (1 ♀, CSE), Graafwater (2 ♀, 1 ♂, FSCA), Kliprand 60 km WNW Loeriesfontein (5 ♂, OÖLM), Knersflakte: Kalkgat (1 ♀), Konstabel Farm 30 km WSW Matjiesfontein (1 ♀, 13 ♂), Laingsburg at 33°12′S 20°51′E (1 ♀), Lambert's Bay (1 ♀, OÖLM), 5 km S Lambert's Bay (1 ♀, 3 ♂, OÖLM), 40 km S Lambert's Bay (1 ♂, OÖLM), Matjiesfontein (2 ♂, BMNH), Murraysburg (1 ♂, SAM), Rooinek Pass (1 ♂, SAM).



374. Collecting localities of *Tachysphex subfimbriatus* and *sulcidorsum*.

Tachysphex sulcidorsum de Beaumont

Figures 374, 375.

Tachysphex sulcidorsum de Beaumont, 1950a:406, ♀, ♂. Holotype: ♀, Algeria: Laghouat (BMNH), examined in 1974.— de Beaumont, 1952a:195 (Algeria), 1955a:186 (Morocco); Pulawski, 1971:115 (in revision of Palearctic *Tachysphex*); Bohart and Menke, 1976:277 (listed).

RECOGNITION.— *Tachysphex sulcidorsum* can be recognized by its unusual thoracic structures: the scutum is deeply impressed anteromesally, the notaulus is expanded into a carina, the scutal flange gradually expands in posterior half and is roundly prominent apically (Fig. 375c), the mesopleural flange is conspicuously expanded, yellowish brown, and overhangs the subalar fossa (Fig. 375d), and the metapleural flange is unusually large. In addition, the free margin of the lateral clypeal section is almost straight, barely concave (Figs. 375a, b).

DESCRIPTION.— Free margin of clypeal lateral section shallowly concave, almost straight (Figs. 375a, b). Scutum anterior declivity almost perpendicular to disk, disk deeply impressed anteromesally, notaulus raised into carina; scutal flange gradually expanding in apical half, roundly prominent apically (Fig. 375c). Scutal and mesopleural punctures well defined, most punctures one diameter apart or less, many mesopleural punctures in male more than one diameter apart, interspaces unsculptured. Mesopleural flange conspicuously expanded, overhanging subalar fossa (Fig. 375d). Mesopleural punctures about one diameter apart, some punctures in female more than one diameter apart. Punctures of mesothoracic venter (except along midline) slightly more than one diameter apart in female, several diameters apart in male. Metapleural flange conspicuously expanded. Propodeal dorsum irregularly rugose, with tendency to form longitudinal ridges; side ridged. Hindcoxal dorsum with inner margin carinate basally

Setae erect on postocellar area, minimally longer than midocellar diameter; scutal setae suberect, thickened except anterolaterally and posteriorly; erect on each side of oral fossa next to occipital carina, slightly longer than midocellar diameter; inclined anterad on propodeal dorsum.

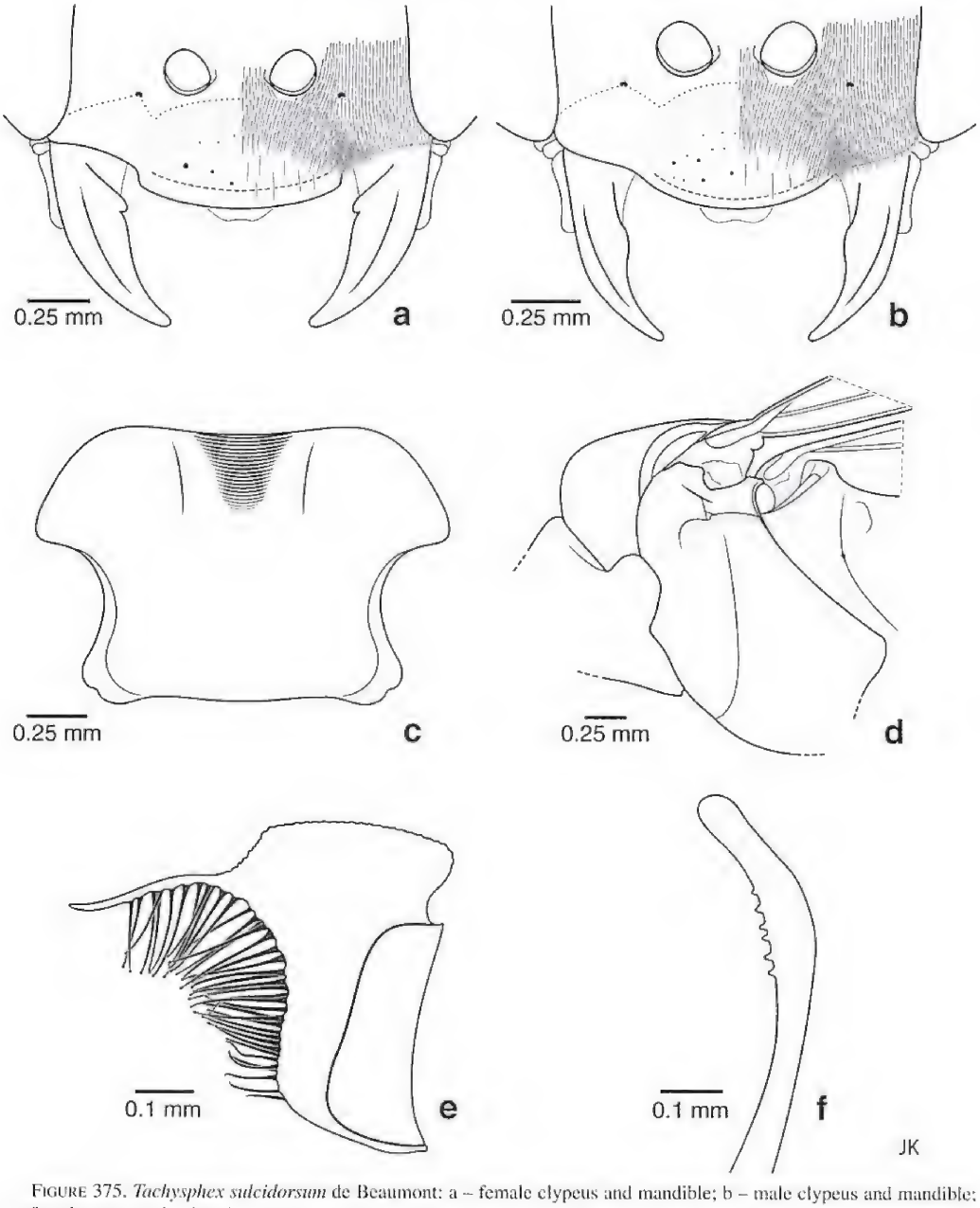


FIGURE 375. *Tachysphex sulcidorsum* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – female scutum; d – female mesothorax in lateral view; e – volsella; f – penis valve.

Head and thorax black, mandible reddish except black apically, pronotal lobe yellowish or reddish, and scutal flange (except anteriorly), mesopleural flange, and metapleural flange (except anteriorly) pale brown. Frontal setae silvery in both sexes. Wing membrane almost hyaline; costal vein of forewing yellowish brown, subcostal vein reddish brown. Femora reddish in female, in male black except red apically. Tibiae and tarsi red. Gaster red in female; in male either segments I–III

red and remainder dark or gaster largely black except anterior terga and sterna reddish laterally. Terga I–IV in female, I–VI in male, silvery fasciate apically.

♀.— Clypeus (Fig. 375a): bevel longer than basomedian area; lip free margin arcuate, not incised laterally. Width of postocellar area 1.7 × length. Dorsal length of flagellomere I 2.2 × apical width. Dorsal foretibial surface with two small spines; outer surface with two spines. Forebasitarsus with eight rake spines. Midtrochanteral venter impunctate. Midtibial outer surface partly asetose. Apical depression of tergum V asetose. Pygidial plate with most punctures several diameters apart; interspaces microsculptured. Length 7.5–9.0 mm.

♂.— Mandible: trimmal carina expanded subbasally but without tooth or cleft. Clypeus (Fig. 375b): bevel about as long as basomedian area; lip free margin arcuate, distance between corners 1.5 × distance between corner and orbit. Width of postocellar area 2.4 × length. Dorsal length of flagellomere I 1.0–1.2 × apical width; ventral length slightly smaller than apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length 5.5–6.0 mm. Volsella and penis valve: Figs. 375e, f.

Geographic distribution (Fig. 374).— Morocco, Algeria.

Records.— ALGERIA: Biskra (1 ♀, paratype of *sulcidorsum*), Idjef Melène in Hoggar Mts. (de Beaumont, 1952a), Laghouat (de Beaumont, 1950a). **MOROCCO**: Ksar es Souk (1 ♂, paratype of *sulcidorsum*).

Tachysphex sycorax Arnold, new status

Figures 376, 377.

Tachysphex panzeri var. *sycorax* Arnold, 1923:169, ♂ (as *Sycorax*, incorrect original capitalization). Holotype: ♂, Zimbabwe: Bulawayo (SAM), examined.— Arnold, 1930:4 (in checklist of Afrotropical Sphecidae).— As *Tachysphex panzeri sycorax*: Bohart and Menke, 1976:275 (new status, listed).

Type material.— Arnold labeled a female (collected 29 September 1923) and a male (28 September 1920) as types of *sycorax*. Since the female was not included in the original description, it is not part of the type series, and the male is therefore the holotype.

Recognition.— *Tachysphex sycorax*, known only from Zimbabwe and North-West Province of South Africa, has the labrum convex, protruding beyond the clypeal free margin, galea as long as the scape, width of postocellar area smaller than length, propodeal side uniformly microsculptured, and terga I–IV (I–V in male) silvery fasciate apically. Also, the propodeal dorsum is all setose, with setae pointing anterad on a broad median zone (pointing anterolaterad near propodeal foremargin) and adlateral setae contrastingly oriented posterad and joining apicomesally (Fig. 376c). The female differs from similar species in having the following combination: apical depression of tergum V largely asetose (setose mesally in some specimens), foretibial outer and midtibial dorsal surface with glabrous, longitudinal zone (at least in apical half), and forecoxa with short apicomedian process (Figs. 376d, e). In the male, the foretarsal rake is well developed, the clypeal free margin is emarginate mesally and the lip corners are slightly closer to each other than to the adjacent orbit, the foretibial outer surface has a glabrous or sparsely setose longitudinal zone, and the volsellar dorsal process is low (Fig. 376f).

Tachysphex sycorax is superficially similar to *dolosus*. In the latter species, however, setae of the propodeal dorsum are oriented mostly anterad (Fig. 124a), without adlateral setae being oriented posterad and joining posteriorly (although orientation of setae may be altered by mechanical handling or specimens' old age). Also, the female forecoxa of *dolosus* has no apical process, and the volsella is different (compare Figs. 376f and 124b). The Northern Hemisphere species *incertus* is also similar (see p. 352 for differences).

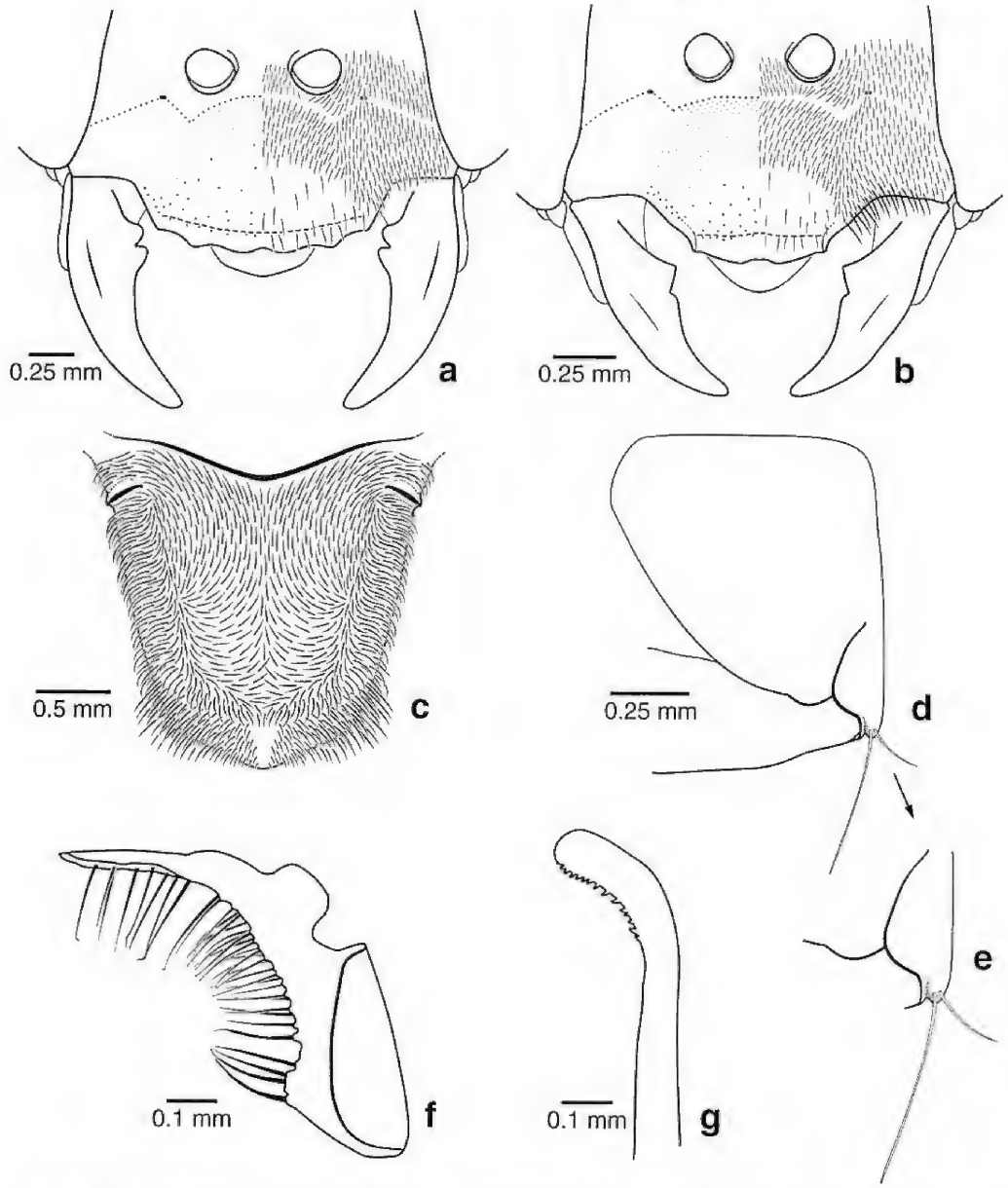


FIGURE 376. *Tachysphex sycorax* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum of female showing setal pattern; d – female forecoxa; e – apex of female forecoxa; f – volsella; g – penis valve.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea closely punctate except along anterior margin, as long as scape. Scutal punctures averaging about one diameter apart on disk in female, less than that in male. Mesopleuron evenly microsculptured, dull, punctures indiscernible. Propodeal dorsum evenly microareolate, side evenly microsculptured. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum; erect on each side of oral fossa next to occipital carina (setal length about 0.25 × basal mandibular width); on propodeal dorsum pointing anterad on broad median zone (pointing anterolaterad near propodeal foremargin), but adlateral setae oriented posterad and joining apicomesally (Fig. 376c).

Head and thorax black except the following: mandible yellowish red (black apically); scape yellow; pronotal lobe pale yellow posteriorly; female clypeus largely yellow, narrowly black basally, lateral sections red; clypeal middle section of male yellow in about apical half to two thirds. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate, almost hyaline; forewing costal and subcostal veins light brown. Legs red except coxae and trochanters black in male. Gaster all red in female; in male segments II–V, III–V, or II–VII brown, remainder red. Terga I–IV in female, I–V in male, silvery fasciate apically.

♀.— Clypeus (Fig. 376a): bevel about as long as basomedian area; lip free margin arcuate, emarginate mesally, broadly incised laterally. Width of postocellar area 0.7 × length. Dorsal length of flagellomere I 2.6 × apical width. Forecoxa with small apicomedian process (Figs. 376d, e). Dorsal foretibial surface with three spines; outer surface impunctate, glabrous (at least in distal half), with two spines. Forebasitarsus with nine rake spines. Midtibia with small, glabrous area dorsoapically. Apical spines of hindtarsomere IV long, reaching claw bases. Apical depression of tergum V impunctate, glabrous (except punctate and setose along midline in some specimens). Pygidial plate with punctures averaging about one diameter apart; interspaces alutaceous, shiny. Length 11.3–13.9 mm.

♂.— Mandible: trimmal carina with tooth and small cleft. Clypeus (Fig. 376b): bevel shorter than basomedian area; lip free margin arcuate, emarginate mesally, with well-defined corner; distance between corners 0.9 × distance between corner and orbit. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 1.9–2.0 × apical width. Forefemoral notch microscopically setose. Foretibial outer surface with glabrous or sparsely setose zone. Outer margin of forebasitarsus with six or seven rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Length 8.6–9.7 mm. Volsella and penis valve: Figs. 376f, g.

COLLECTING PERIOD.— 28–30 September, 1, 10, and 12 October.

GEOGRAPHIC DISTRIBUTION (Fig. 377).— North-West Province of South Africa, Zimbabwe.

RECORDS.— **SOUTH AFRICA: North-West Province**: Rustenburg (1 ♀, USNM). **ZIMBABWE:** Bulawayo (1 ♀, 1 ♂; 4 ♀, 9 ♂, SAM, including holotype and paratype of *sycorax*; 1 ♀, 1 ♂, TMP), Lonely Mine (Arnold, 1923). Some specimens from Bulawayo determined as *sycorax* by G. Arnold are actually *dolosus* (see that species).

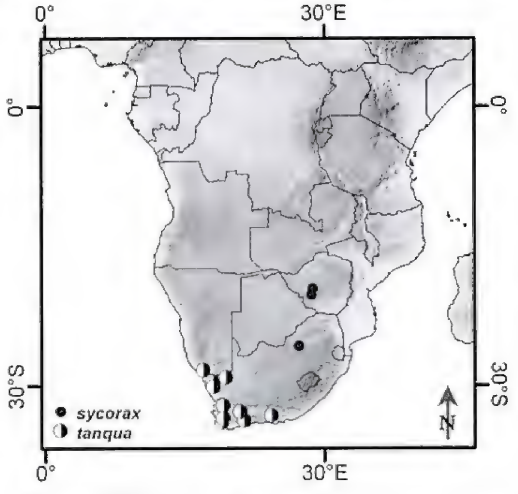


FIGURE 377. Collecting localities of *Tachysphex sycorax* and *tanqua*.

Tachysphex taita Pulawski, sp. nov.

Figures 378, 379.

DERIVATION OF NAME.— Named after the Taita people of southeastern Kenya in whose territory the species was first collected, as well as an allusion to Taita Hills.

Recognition.— *Tachysphex taita*, from Kenya, Tanzania, and Namibia, is one of many species in which the labrum is conspicuously convex and protruding beyond the clypeal free margin, and the galea is longer than wide in profile. In addition, the scutal punctures average less than one diameter apart, the genal setae are straight, no longer than the midocellar diameter, the propodeal side is uniformly microsculptured, the setae adjacent to the hypostomal carina are straight and no longer than a midocellar diameter, and oriented posterad on the propodeal dorsum apicomesally. In the female, tergum V is glabrous (setose mesally in some specimens), and the male foretarsus has a well-defined rake.

Several other species share these characters, but the female of *taita* differs from most in having a laterally sinuous rather than incised clypeal lip (Fig. 378a), setae with golden tinge on the upper frons, and markedly golden on the thoracic dorsum (including the propodeal dorsum). *Tachysphex palopterus* is similar, but has the scutal setae silvery or with a golden tinge. Also, in many (but not all) *taita*, the pygidial plate is broad, as in *incertus* (see Fig. 192c), and the apical depression is setose mesally. In *palopterus*, the pygidial plate is narrow and the apical depression of tergum V is asetose. Unlike *camptopygus*, the pygidial plate of *taita* is not downcurved apically and the gaster is black apically (rather than all red or with irregular black spots).

The male can be recognized by the presence of a sharp carina that separates the hindfemoral venter from its inner surface (except basally) and the trimmal mandibular carina reduced distad of tooth and contrastingly sharp (the usual shape) preapically (Fig. 378b), a unique such combination. Among the species with a convex labrum, a reduced trimmal carina is also found in *camptopygus* and many *sahelensis*. *Tachysphex taita*, however, differs from *camptopygus* by several features (in addition to the hindfemoral structure): clypeus black and gaster red basally (rather than red and all

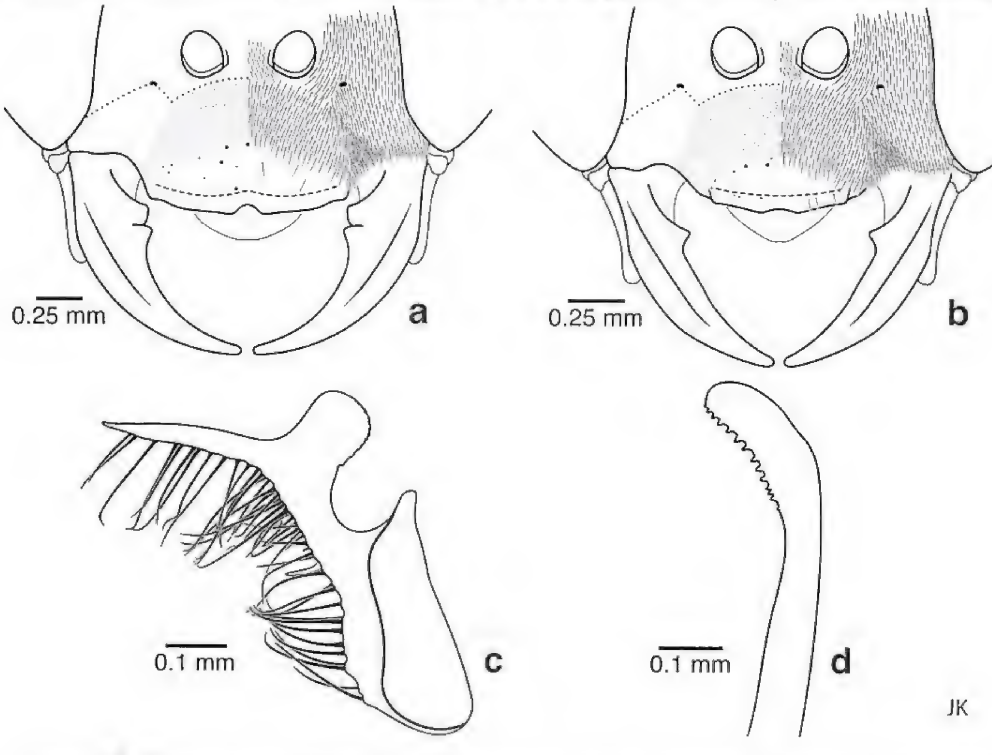


Figure 378. *Tachysphex taita* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

black, respectively), galea shiny, with well-defined punctures (rather than dull, with ill-defined punctures), and hindmargin of sternum VIII simply emarginate apically (rather than tridentate or with blunt mesal projection). Finally, the foretarsal rake is well developed in *taita*, but absent in *sahelensis*.

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea shiny, with a few, sparse, well-defined punctures; in profile longer than wide, as long as 0.8 of scape. Scutal punctures averaging less than one diameter apart, but some punctures about one or two diameters apart; interspaces dull, microsculptured in males and most females (hence punctures appearing ill defined). Mesopleuron uniformly microsculptured, dull. Propodeal dorsum evenly microareolate; side uniformly microsculptured. Hindcoxal dorsum with inner margin carinate basally.

Setae appressed on postocellar area and scutum; on each side of oral fossa next to occipital carina mostly subappressed, shorter than midocellar diameter, but a few setae nearly erect, about as long as midocellar diameter; adlateral setae of propodeal dorsum oriented obliquely posterad and meeting apicomesally, admedian setae diverging anterolaterad from midline in anterior half or so, converging obliquely posterad toward midline in posterior half or so.

Head and thorax black, mandible reddish except black basally and apically, clypeal bevel reddish in some females. Setae in female with golden tinge on upper frons, golden on scutum, scutellum, metanotum, and propodeal dorsum; in male golden on clypeus and frons. Wing membrane yellowish (only slightly so in smallest males); veins all reddish brown. Femora red except black basodorsally, tibiae and tarsi red. Gastral segments I–III red (also tergum IV in some females, only segments I and II in some males, only most of tergum I and part of II in one female from Watamu, Kenya), remainder dark brown to black. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 378a): bevel about as long as basomedian area; lip free margin arcuate, emarginate mesally, sinuous laterally (at least slightly so). Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 2.6–2.7 × apical width. Dorsal foretibial surface with two or three spines; outer surface with two spines. Forebasitarsus with nine rake spines. Apical depression of tergum V impunctate and asetose or punctate and setose mesally. Pygidial plate with punctures that average several to many diameters apart; interspaces unsculptured to aciculate. Length 10.2–11.4 mm.

♂.— Mandible: trimmal carina with tooth, without cleft, obtuse distad of tooth but contrastingly sharp preapically (Fig. 378b). Clypeus (Fig. 378b): bevel as long as basomedian area or shorter, delimited anterolaterally by oblique carina that emerges from lip corner; lip free margin arcuate, with well-defined corner; distance between corners 1.1–1.3 × distance between corner and orbit. Width of postocellar area 0.7 × length. Dorsal length of flagellomere I 2.1–2.2 × apical width. Forefemoral notch with bottom microscopically setose. Outer margin of forebasitarsus with 3–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp, carina-like in distal half. Length 6.3–9.2 mm. Volsella and penis valve: Figs. 378c, d.

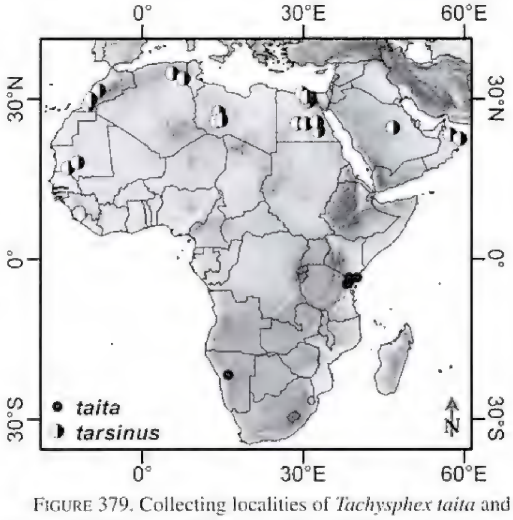


FIGURE 379. Collecting localities of *Tachysphex taita* and *tarsinus* (African and Arabian localities only).

GEOGRAPHIC DISTRIBUTION (Fig. 379).— Kenya, Tanzania, Namibia.

RECORDS.— HOLOTYPE: ♂, **KENYA**: **Coast Province**: 10 km N Taita Discovery Centre, 23 May 2000, V.F. Lee and WJP (CAS). PARATYPES: **KENYA: Coast Province**: same data as holotype (1 ♂); Taita Discovery Centre: Galla Hill area, 2 June 2002, M.A. Bourbin, V.F. Lee, and WJP (2 ♂); Voi, 21–22 May 2000, V.F. Lee and WJP (4 ♀, 2 ♂); Watamu, 6 Dec 1972, AM (1 ♀; 1 ♀, 1 ♂, MSNT). **NAMIBIA**: **Karibib District**: Khan River 23 km N Karibib, 20–21 Feb 1996, WJP (1 ♂). **TANZANIA**: **Tanga Region**: 2 km NE Mkomazi: 26 Dec 2002, WJP (1 ♂); 29–31 Dec 2002, M.A. Prentice (4 ♂; 3 ♂, BMNH) and WJP (1 ♀, 15 ♂); 13 Jan 2003, M.A. Prentice (2 ♂) and WJP (1 ♂).

***Tachysphex tanqua* Pulawski, sp. nov.**
Figures 377, 380.

DERIVATION OF NAME.— *Tanqua*, a Khoi (= Hottentot) name for San (= Bushman), a noun in apposition to the generic name.

RECOGNITION.— Both sexes of *tanqua* have the fore- and midfemoral venters impunctate except for a few, sparse punctures, and gastral terga not fasciate. The female, in addition, has tarsomeres IV roundly emarginate proximally (as in Fig. 48c) and elongate claws, each arolium being less than half length of each adjacent claw (as in Figs. 48c, d), a unique such combination.

The male can be recognized by the femoral sculpture in combination with the following: foretarsus without rake, setae appressed on postocellar area and scutum, clypeal free margin slightly concave between middle tooth and lip corner (Fig. 380b), propodeal side ridged (ridges evanescent in many specimens), gaster red basally and black apically, and in many specimens femora all or partly red. Also, setae are appressed on sterna III–VI.

DESCRIPTION.— Galea about as long as wide in lateral view, as long as 0.6 of scape. Scutal punctures unevenly distributed on disk, averaging about 2–3 diameters in female, 1–3 diameters in male; interspaces shiny. Mesopleural punctures, near center, averaging several diameters apart. Punctures of mesothoracic venter, in many specimens, several diameters apart except less than one diameter apart along midline. Propodeal dorsum conspicuously ridged in female, finely ridged or evenly microareolate in male; side ridged (ridges evanescent in many males). Hindcoxal dorsum with inner margin carinate basally.

Setae suberect on each side of oral fossa next to occipital carina, about one midocellar diameter long; on postocellar area suberect and shorter than midocellar diameter in female, appressed in male; appressed on scutum; uniformly erect or oriented posterad on propodeal dorsum.

Head and thorax black, mandible red mesally. Frontal setae silvery in female, golden in male. Wing membrane slightly infumate; forewing costal vein reddish brown (light brown in specimen from Little Karoo), subcostal vein brown. Femora varying from all black to all red (except black basally), tibiae and tarsi red. Gaster red basally (segments I–III in female, I–III or I–IV in male), remainder black. Terga not fasciate apically.

♀.— Clypeus (Fig. 380a): bevel markedly longer than basomedian area; lip conspicuously arcuate, with rudimentary lateral incision. Width of postocellar area 0.7 × length. Dorsal length of flagellomere I 2.5 × apical width. Forecoxa with minute apicomedian process. Midtrochanteral venter unsculptured, shiny. Fore- and midfemoral venters aciculate, with well-defined punctures that are many diameters apart. Dorsal foretibial surface with one or two spines; outer surface broadly glabrous, with several spines. Forebasitarsus with 18 rake spines, its outer margin broadly concave. Tarsomeres IV with dorsoapical emargination rounded proximally (as in Fig. 48c); apical width of hindtarsomere IV about 0.9 × length, apicoventral margin shallowly emarginate mesally. Apical tarsomeres elongate, not angulate basally; with short, erect setae but no spines on venter; apicoventral margin produced into lobe (Fig. 380c); each lateral margin with one or two small spines near

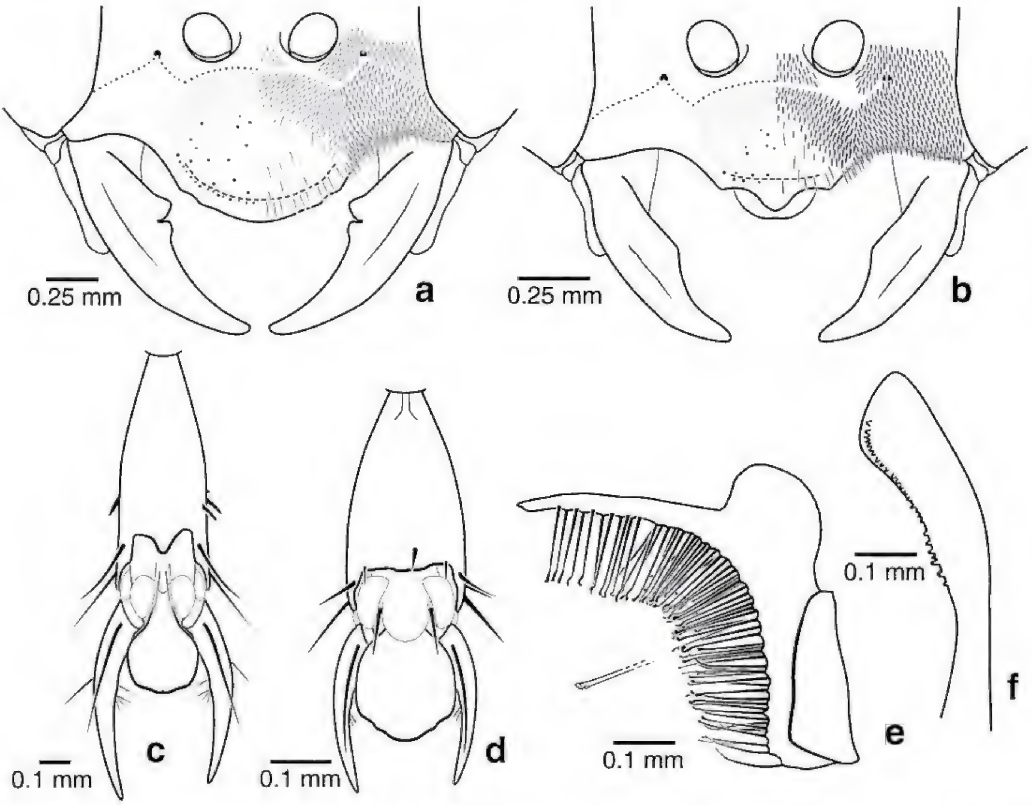


FIGURE 380. *Tachysphex tanqua* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – female hindtarsomere V in ventral view; d – male hindtarsomere V in ventral view; e – volsella; f – penis valve.

midlength (two or three on hindtarsus). Claws elongate, arolium less than half of claw length (as in Figs. 48c, d). Tergum V with punctures that are several diameters apart; apical depression unsculptured, glabrous. Pygidial plate narrowly truncate apically, sparsely punctate (but several punctures next to margin less than one diameter apart), interspaces unsculptured. Length 10.5 mm.

♂.— Mandible: trimmal carina broadly angulate, without tooth or cleft (Fig. 380b). Clypeus (Fig. 380b): bevel ill defined; lip free margin with obtuse median point and well-defined corner, concave between midpoint and corner; distance between corners about 1.1 × distance between corner and orbit. Width of postocellar area 0.6–0.7 × length. Dorsal length of flagellomere I 1.8 × apical width. Fore- and midfemora impunctate on venters and posterior surfaces except for a few punctures that are many diameters apart. Forefemoral notch microscopically setose, slightly larger than average for the genus. Dorsal surface of tibiae (outer surface of foretibia) impunctate or sparsely punctate between spines. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Venters of tarsomeres V each with one spine near center, apical margin slightly arcuate (Fig. 380d). Sternal setae appressed (sterna largely glabrous in specimens from Richtersveld National Park, sterna III–VI largely impunctate). Sternum VIII slightly tridentate (middle tooth smaller than lateral prongs). Length 8.0–10.0 mm. Volsella and penis valve: Figs. 380e, f.

GEOGRAPHIC DISTRIBUTION (Fig. 377).— Northern Cape and Western Cape provinces of South Africa.

RECORDS.— HOLOTYPE: ♀, **SOUTH AFRICA**: **Northern Cape Province**: Pofadder, Oct 1939, [South African] Museum Staff (SAM). PARATYPES: **SOUTH AFRICA**: **Eastern Cape Province**: Goodehoop Farm 16 km W Steytlerville, 19 Nov 1999, M.E. Irwin, E.I. Schlinger, F.D. Parker (1 ♂, USU). **Northern Cape Province**: Goegap (as Hester Malan) Nature Reserve, 15–21 Oct 1987, FSG (2 ♂, AMG); same data except 10–12 Oct 1988 (3 ♂; 1 ♂, AMG); Goegap Nature Reserve: near Kraaiwater at 29°37′S 18°00′E, 3–4 Oct 1994, FSG (1 ♂, AMG); Richtersveld National Park at 28°18.9′S 16°58.3′E, 12–14 Sept 2001, WJP (7 ♂; 2 ♂, BMNH); Sors Sors to Taaiboskraal at 30°08′S 18°01′E, 3 Oct 1995, FSG (1 ♂, AMG). **Western Cape Province**: Bain's Kloof in Wit River Valley, Dec 1949, [South African] Museum Expedition (2 ♂, SAM); 11 km W Clanwilliam on road to Graafwater, 2–8 Oct 1990, FSG (3 ♂, AMG); Jonkers Hoek 36 mi from Cape Town [at 33°58′S 18°58′E], 1930, H.W. Simmonds (1 ♂, BMNH); Klein [= Little] Karoo SE Groot River, 25 Oct 1999, M. Halada (1 ♂; 1 ♂, OÖLM); Moordenaars: Swanepoel, Oct 1952, [South African] Museum Expedition (2 ♂, SAM); Pakhuis Pass 13.5 km ENE Clanwilliam at 32°08′18″S 19°01′14″E, 15 Nov 1996, M.E. Irwin and E.I. Schlinger (1♂; 1 ♂, CSE); E Pakhuis Pass, Sept 1947, [South African] Museum Expedition (1 ♂, SAM); Wellington: Rooshoek, Dec 1973, P.M.F. Verhoeff (1 ♂; 1 ♂, RMNH).

Tachysphex tarsinus (Lepeletier de Saint Fargeau)

Figures 379, 381, 382.

[N.B. There are some 115 literature records of *tarsinus* subsequent to the original description, mostly locality records from Europe, but only the essential nomenclatural references are presented below. Previous revisionary studies are by de Beaumont 1936a:206, 1947a:198, and Pulawski, 1971:158.]

Tachytes tarsinus Lepeletier de Saint Fargeau, 1845:243, ♂ (as *tarsina*, incorrect original termination). Holotype or syntypes: ♂, France: probably Dauphinée: no specific locality (MNHN), not examined.— As *Tachysphex tarsinus*: Kohl, 1885:398 (tentative new combination, original description copied); Dalla Torre, 1897:686 (new combination, in catalog of world Hymenoptera).

Tachysphex nitidus Spin., variété B: de Beaumont, 1936a:206 (in revision of French *Tachysphex*). Synonymized with *Tachysphex tarsinus* by de Beaumont, 1940:175.

RECOGNITION.— *Tachysphex tarsinus* is an all black species occurring north of the equator, with well-defined mesopleural punctures and shiny interspaces, and with setae erect on the postocellar area, nearly so on the scutum anteriorly, suberect on midfemoral venter (shorter than one midocellar diameter), and inclined obliquely anterad on the propodeal dorsum. Other characters include a flat, nonemarginate labrum, presence of only three silvery tergal fasciae, and unspecialized tarsi (length of midtarsomere II more than twice length, tarsomeres IV longer than wide apically, tarsomeres V without spines on the venter or lateral margins).

The female of *tarsinus* is difficult to recognize without comparative material. It is characterized by a clypeal bevel clearly shorter than the basomedian area (except narrowly extending to about clypeal midlength in some specimens), the lip free margin arcuate, not incised laterally (Fig. 381), and the mesopleural punctures less than to slightly more than one diameter apart. *Tachysphex lindbergi* (Cape Verde Islands and Madeira) is similar, but its mesopleural punctures are finer, about two diameters apart beneath the mesopleuron center. Unlike *nitidior*, the punctures of sterna III and IV are ill-defined in *tarsinus* and in most cases do not extend to the apical depression.

The male of *tarsinus* can be recognized by the unusually dense setae of the forefemoral notch (Fig. 381c), markedly denser than on the remaining femoral surface. Additional recognition characters are: clypeal lip with a well-defined corner (Fig. 381b), length of flagellomere IV less than 2.0 × apical width, forebasitarsal outer margin without preapical spines or with a few spines near the base that are nearly as long as the basitarsus width, and sternum VIII evenly emarginate apically. Also, the free margin of the clypeal lip is concave in many African specimens (Fig. 381b).

DESCRIPTION.— Scutal punctures well defined, no more than one diameter apart, but up to several diameters apart on disk in most specimens from Lebanon; interspaces shiny. Mesopleural punc-

tures well defined except effaced posteroventrally in some specimens, less than to slightly more than one diameter apart; interspaces unsculptured or slightly microsculptured. Propodeal dorsum irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect, straight or angled apically on each side of oral fossa next to occipital carina (setal length 0.2–0.4 × basal mandibular width); erect on postocellar area (1.0–1.5 × midocellar diameter long), inclined posterad on scutum (about one midocellar diameter long anteriorly); inclined anterolaterad on propodeal dorsum; suberect on midfemoral venter (shorter than midocellar diameter).

Head, thorax, legs, and gaster black except mandible reddish mesally and tarsal apex brown. Frontal setae silvery in both sexes. Wing membrane infumate, nearly hyaline in Egyptian specimens; costal and subcostal veins of forewing brown or subcostal vein yellowish (Egyptian, Mauritanian, and some Kazakh specimens). Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 381a): bevel markedly shorter than basomedian area (narrowly extending mesally to about clypeal midlength in some specimens); lip free margin arcuate, not incised laterally. Width of postocellar area 1.2–1.5 × length. Dorsal length of flagellomere I 1.9–2.4 × apical width. Dorsal foretibial surface with one or two small spines; outer surface with one spine in most specimens, with two in some. Forebasitarsus with 6–9 rake spines. Apical depression of tergum V either setose or glabrous. Pygidial plate alutaceous to almost unsculptured, with punctures that aver-

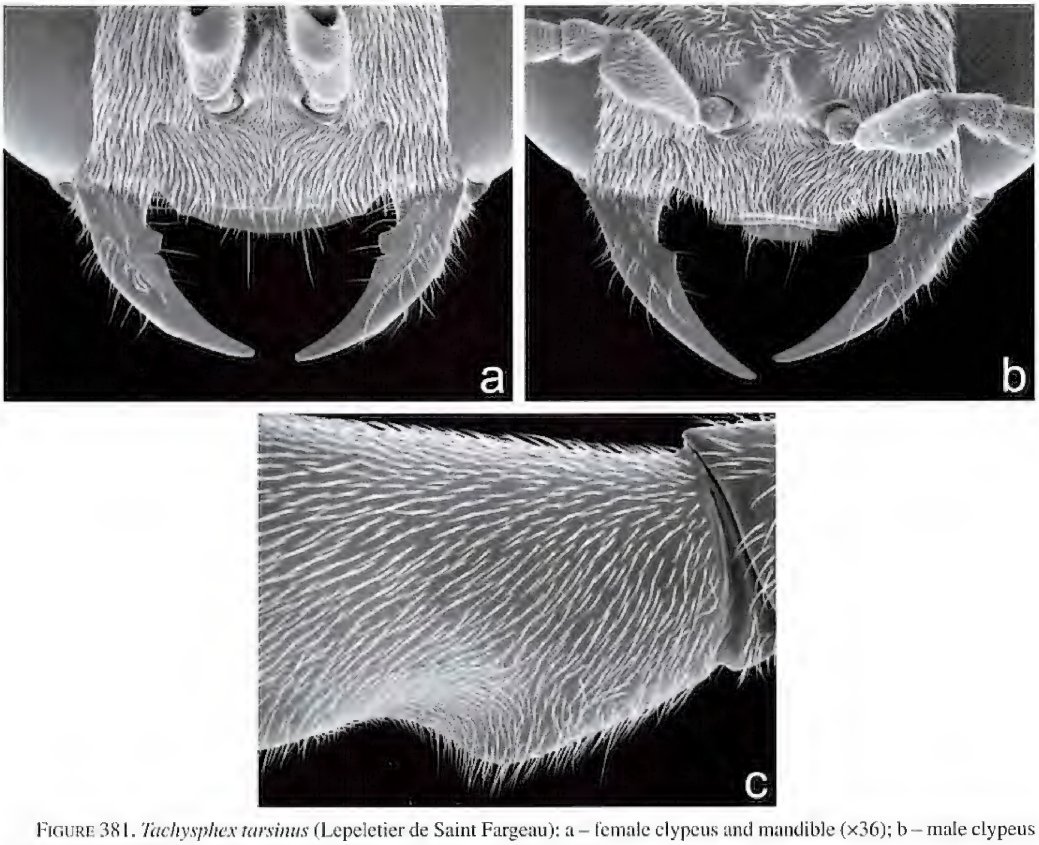


FIGURE 381. *Tachysphex tarsinus* (Lepeletier de Saint Fargeau): a – female clypeus and mandible (×36); b – male clypeus and mandible (×29); c – base of male forefemur showing notch (×144).

age many diameters apart (but close to each other near margin in some specimens); punctures evanescent in some specimens. Length 6.5–11.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 381b): bevel crescent-like, markedly shorter than basomedian area; lip reduced in size, its free margin either slightly arcuate, or straight, or (most African specimens) slightly concave; lip corner well defined, slightly prominent; distance between corners 0.8–1.1 × distance between corner and orbit. Width of postocellar area 1.5–1.7 × length. Dorsal length of flagellomere I 1.1–1.6 × apical width. Forefemoral notch (Fig. 381c) with bottom microscopically, densely setose (setae markedly denser than on adjacent surface). Outer margin of forebasitarsus without preapical spines or, in some specimens, with a few spines near base (spine length nearly equal to tarsomere width); outer apical spine of foretarsomere II shorter than tarsomere III. Tergum VII punctate, punctures well defined in some specimens from Kazakhstan, evanescent in those from Egypt. Length 4.3–8.5 mm. Volsella and penis valve: Fig. 382.

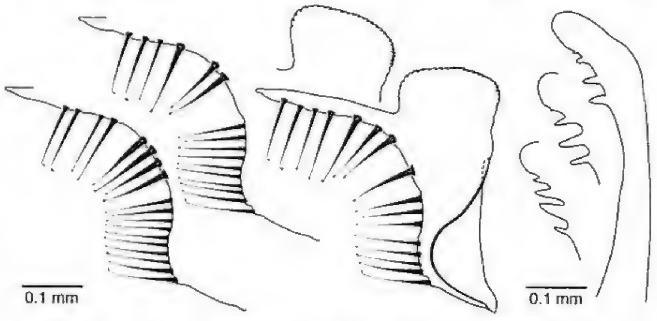


FIGURE 382. *Tachysphex tarsinus* (Lepeletier de Saint Fargeau): volsella and penis valve with outlines showing variation.

LARVA.— Asís, Gayubo, and Tormos (1989) described a mature larva of *tarsinus*.

GEOGRAPHIC DISTRIBUTION (Fig. 379).— North Africa south to Mauritania and Aswan area in Egypt; Europe north to northern France, most of Germany (Ohl et al., 2001), central Poland, Belarus (Shlyakhtenok and Skibinska, 2002), and Bryansk Oblast' in Russia (Kolesnikov, 1977); and Asia: Arabian Peninsula, Lebanon, Israel, east to Kazakhstan and Kiangsu Province of China.

RECORDS (only African and Arabian localities).— **ALGERIA**: 15 km W Biskra (1 ♀, ZMAN), Laghouat (de Beaumont, 1950). **EGYPT**: **Al Buhayrah**: Sahara Inn Hotel 117 km SE Alexandria (1 ♀, 2 ♂, FSCA). **Al Fayyum**: Kom Osheim (3 ♂; 3 ♂, MSNT). **Al Iskanderiyah** (= Alexandria): Mansuria and Mariout: Dekhela (de Beaumont, 1940). **Al Jizah** (= Ghiza): Dahshur (2 ♀), Ghiza (2 ♀, 3 ♂), Kerdasa (de Beaumont, 1940). **Al Qahirah** (= Cairo): Gebel Asfar (de Beaumont, 1940), Maadi (3 ♀, 4 ♂). **Al-Uqsur** (= Luxor): Luxor (1 ♀, SCHL). **Al-Wadi al-Jadid**: Dahkhla oasis: Ewina (1 ♀, ZMAN), Mut (1 ♀, ZMAN); Kharga oasis: Kharga (4 ♀, 5 ♂). **Aswan**: Aswan (6 ♀, 15 ♂). **LIBYA** (de Beaumont, 1956): **Fezzan**: Brak, Mourzouk, Oum el Araneb. **MAURITANIA**: 20 km NE Aleg (1 ♂), Oued Henné ca 50 air km NE Moudjéria (3 ♀). **MOROCCO**: Goulimine: Oued Seyad (1 ♀, 5 ♂), Marrakech (de Beaumont, 1955), Tiznit: Oued Massa (de Beaumont, 1955). **OMAN** (Guichard, 1980): **Northern Oman**: Rostaq, Tinaf. **SAUDI ARABIA**: El Riyadh (Pulawski, 1971). **TUNISIA**: 15 km W Nefta at 33°50′N 7°43′E (2 ♂, CSE).

Tachysphex tembe Pulawski, sp. nov.

Figures 383, 384.

DERIVATION OF NAME.— Named after Tembe Elephant Park, South Africa, where the type series was collected; a noun in apposition to the generic name.

RECOGNITION.— *Tachysphex tembe* is an all black South African species. The female (the male is unknown) is characterized by an emarginate labrum, the presence of sensory areas on flagellomeres III–IX, slightly shortened midtarsomeres (e.g., the length of midtarsomeres II and III is about 1.9 × and 1.1 × the apical width, respectively), and venter of apical tarsomeres with at least one apicomedian spine. Additionally, the supraantennal swelling is largely impunctate and not enlarged,

the mesopleural punctures are minute and ill defined (interspaces dull, microsculptured), and the propodeal side is minutely punctate, not ridged.

Description (female only).— Scutal punctures minute, 1–2 diameters apart except for a few larger, sparse punctures. Mesopleural punctures minute, about 2–3 diameters apart near center, interspaces markedly microsculptured, dull. Episternal sulcus complete. Propodeal dorsum evenly microareolate; side minutely punctate, not ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on each side of oral fossa next to occipital carina, shorter than midocellar diameter; appressed on postocellar area and scutum; oriented posterad on propodeal dorsum.

Body black, mandible dark reddish mesally, apical tarsomeres brown. Frontal setae silvery in female. Wing membrane brownish yellow; costal vein of forewing reddish brown, subcostal vein dark brown. Terga I–III silvery fasciate apically.

♀.— Labrum with well-defined emargination. Clypeus (Fig. 383): bevel shorter than basomedian area; lip free margin arcuate, slightly emarginate mesally, with ill-defined sublateral incision and one lateral incision; clypeal midlength equal to distance between lip corners. Width of postocellar area 1.1 × length. Dorsal length of flagellomere I 1.7 × apical width; flagellomeres III–IX with characteristic sensory areas. Dorsal foretibial surface with one or two spines; outer surface with two or three bristles. Tarsi slightly shortened: length of fore- and midtarsomeres II about 1.4 and 1.9 × apical width, respectively; of midtarsomere III 1.1 apical width; of fore-, mid-, and hindtarsomeres IV about 0.9, 0.9, and 1.0 × apical width, respectively. Forebasitarsus with 9 or 10 rake spines. Apical tarsomeres with at least one apicomedian spine on venter, without spines on lateral margins. Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures of two sizes: smaller and larger, most punctures several diameters apart; interspaces unsculptured. Length 10.7–12.1 mm.

♂.— Unknown.

Geographic distribution (Fig. 384).— Eastern South Africa.

Records.— Holotype: ♀, **SOUTH AFRICA**: **Kwazulu-Natal**: Tembe Elephant Park, 30 Nov 2002, Marek Halada (OÖLM). Paratypes: same data as holotype but 8 Dec 2002 (1 ♀; 1 ♀, OÖLM).

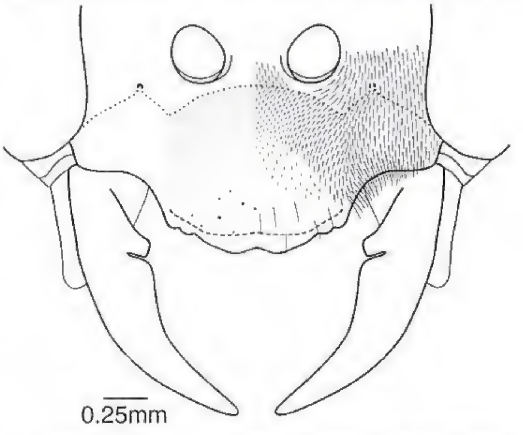


Figure 383. *Tachysphex tembe* Pulawski, sp. nov.: female clypeus and mandible.

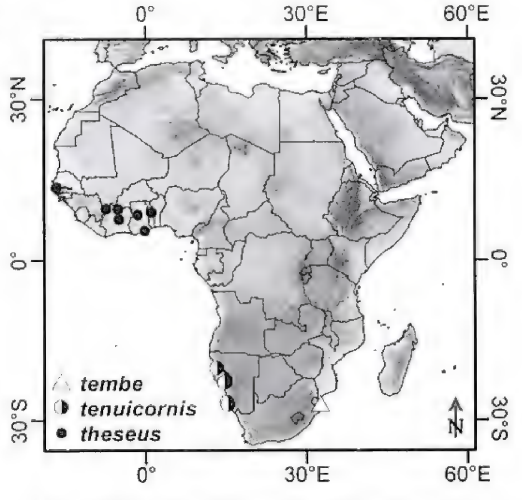


Figure 384. Collecting localities of *Tachysphex tembe*, *tenuicornis*, and *theseus*.

***Tachysphex tenuicornis* Bischoff**

Figures 384, 385–387.

Tachysphex tenuicornis Bischoff, 1913a:120, ♀, ♂. Lectotype: ♀, Namibia: Lüderitz District: Prinzen Bucht S of Lüderitz (ZMHU), **here designated**, examined.— Arnold, 1923:175 (listed), 176 (original description translated into English), 1930:4 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed).

Recognition.— *Tachysphex tenuicornis* has the labrum convex and protruding well beyond the clypeal free margin (Figs. 385a-d) and the galea at least as long as the scape. It differs from all other such species in having erect, sinuous setae on the postocellar area (Fig. 386a) in combination with an all black gaster (the apical depressions of segments are translucent). It also has an unusually small mandibular notch (Figs. 385c, d), a character shared only with *hadronyx*. Subsidiary recognition features are: setae erect and sinuous on the gena and thorax, all appressed on tergum I, hindfemoral venter glabrous in distal half or so; female flagellum unusually long (Fig. 385e), and width of postocellar area 1.0–1.2 × length in female and 1.2–1.4 in male. Erect and sinuous setae and the elongate flagellum are shared with *hadronyx*, in which, however, the gaster is red basally, the setae of tergum I are erect on the basal declivity, the width of the postocellar area is 1.7–1.8 × length in female and 1.8–1.9 in male, and the female claws are unusually thick (Fig. 175f).

Description.— Labrum convex, markedly protruding from beneath clypeus (Figs. 385a-d). Galea aciculate, sparsely punctate, as long as 1.0 of scape in female and 1.1 in male. Mandibular notch unusually small, markedly distant from mandibular base: distance between notch base and orbit about 1.9 × basal mandibular width (Figs. 385c, d). Middle clypeal section markedly convex. Scutal punctures about 2–3 to several diameters apart on disk, interspaces aciculate to unsculptured. Mesopleuron dull, its punctures minute, ill defined, several diameters apart. Propodeal dorsum dull, longitudinally ridged mesally, microscopically rugose laterally (ridges evanescent and irregular in some specimens); side ridged but ridges evanescent in some males; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate except apically.

Setae erect and sinuous on postocellar area (Fig. 386a), gena, scutum, mesopleuron, propodeal dorsum and posterior surface, and on female midfemoral venter (at least in distal half); inclined anterolaterad on propodeal dorsum. Setal length expressed as a fraction of basal mandibular width: about 0.5 on postocellar area, about 0.8 on each side of oral fossa next to occipital carina, about 0.5 on scutum anteriorly, about 0.6 on propodeal dorsum. Hindfemoral venter glabrous in distal half or so.

Head and thorax black but the following are yellowish red: mandible (except apically), clypeal bevel and lip (except some males), and labrum. Frontal vestiture silvery in female, golden in male. Wings hyaline, forewing costal and subcostal veins light brown. Femora black (except apex), tibiae and tarsi red or tibiae largely black. Gaster black, apical depression of terga translucent. Terga I–IV or I–V silvery fasciate apically (fasciae becoming ill defined toward gastral apex).

♀.— Mandible: trimmal carina with largely reduced tooth (Fig. 385a). Clypeus (Fig. 385a): bevel about as long as basomedian area; lip free margin arcuate, minimally emarginate mesally, not incised laterally. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 4.0–4.2 × apical width, that of flagellomere II 5.5–6.2 × apical width, remaining flagellomeres unusually long (Fig. 385e), with differentiated setae and with pores (Fig. 385f). Forefemoral venter with minute, shallow punctures that in some specimens are several diameters apart. Dorsal foretibial surface with two or three spines; outer surface with two spines. Forebasitarsus with 5–8 rake spines (mostly seven). Apical depression of tergum V microsculptured, sparsely setose. Length 6.8–9.5 mm.

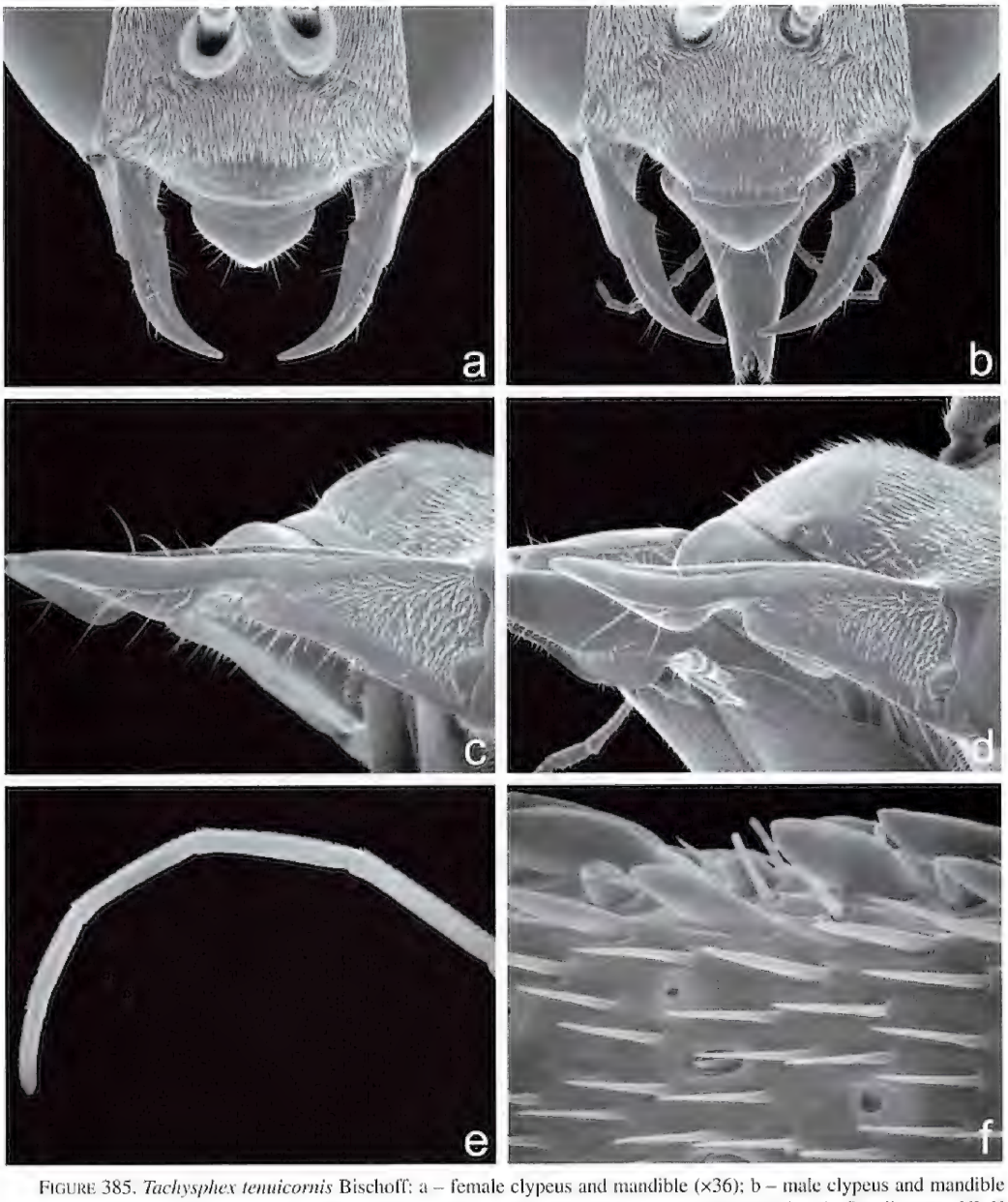


FIGURE 385. *Tachysphex tenuicornis* Bischoff: a – female clypeus and mandible (×36); b – male clypeus and mandible (×48); c – female mandible in lateral view (×60); d – male mandible in lateral view (×60); e – female flagellomeres VI–X (×39); f – portion of female flagellomere VII showing different types of setae and pores (×900).

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 385b): bevel about as long as basomedian area; lip free margin evenly arcuate or emarginate mesally, with well-defined corner; distance between corners 0.8 × distance between corner and orbit. Width of postocellar area 1.2–1.4 × length. Dorsal length of flagellomere I 2.5–2.8 × apical width, that of flagellomere II 3.5–3.6 × apical width. Forefemoral notch asetose, smaller than average for *Tachysphex* (Fig. 386b).

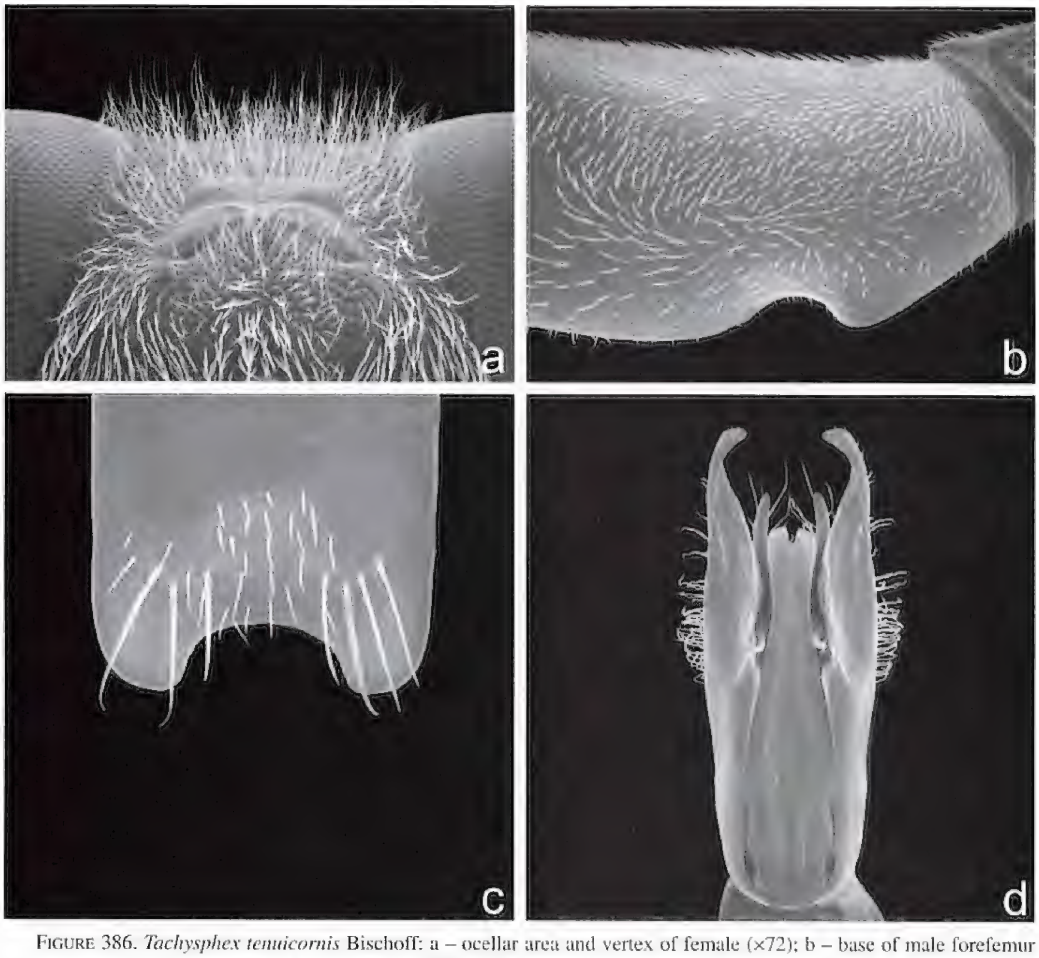


FIGURE 386. *Tachysphex tenuicornis* Bischoff: a – ocellar area and vertex of female (×72); b – base of male forefemur showing notch (×120); c – apex of male sternum VIII (×180); d – male genitalia (×69).

Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Tergum VII conspicuously microsculptured, punctures evanescent. Sterna V and VI (except laterally) each with subbasal, erect fringe of agglutinated setae (fringes visible only when gaster is fully extended). Apex of sternum VIII with large, semicircular emargination; lateral prongs wide, rounded apically (Fig. 386c). Length 5.8–8.3 mm. Volsella and penis valve: Fig. 387; apex of gonoforceps curved toward midline (Fig. 386d).

HABITAT.— *Tachysphex tenuicornis* occurs

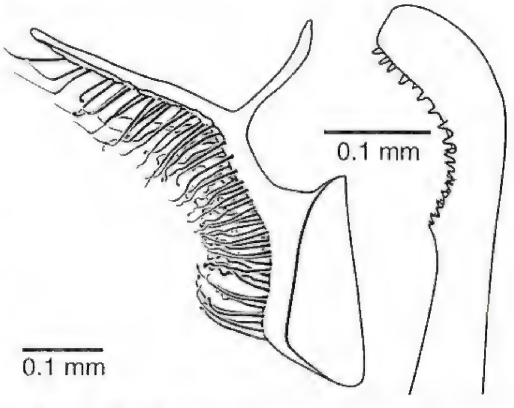


FIGURE 387. *Tachysphex tenuicornis* Bischoff: volsella and penis valve.

in sandy areas that are exposed to the morning fog and during the day to cold oceanic wind. Specimens can be active even in cloudy weather. They fly low over the ground and congregate around hummocks overgrown with small bushes.

Floral records.— Specimens collected 21 km E, 10 km N, and 110 km NW of Swakopmund by F.W. and S.K. Gess were visiting flowers of *Brownanthus kuntzei* (Schinz) Ihlenf and Bittrich, and of *Psilocaulon salicornioides* (Pax) Schwantes, both members of Aizoaceae, and those from 113 km NW of Swakopmund were collected on flowers of *Arthraerua leubnitziae* (Kuntse) Schintz (Amaranthaceae).

Geographic distribution (Fig. 384).— Namibia up to about 30 km inland from coast.

Records.— **NAMIBIA**: **Lüderitz District**: Elizabeth Bay (2 ♂, NMN), Luderitz: Diaz Point (1 ♂, AMG), Lüderitz: Grosse Bucht (1 ♀, AMG), Prinzen Bay S Lüderitz (1 ♀, ZMHU, lectotype of *tenuicornis*). **Swakopmund District**: NW Cape Cross at 21°44′S 13°50′E (3 ♂, AMG), Hentiesbaai (1 ♀, 13 ♂; 4 ♂, NMN), 20 km NE Hentiesbaai (1 ♀, 13 ♂; 4 ♂, NHMZ), 33 km NW Hentiesbaai (5 ♀, 10 ♂; 2 ♀, NHMZ), near Rossing Mountain, at 22°34′S 14°49′E (1 ♂, AMG), Swakop River mouth (1 ♂; 2 ♂, ZMUC), Swakopmund (1 ♂; 2 ♀, AMG; 2 ♂, BMNH; 1 ♀, 2 ♂, FSCA; 2 ♂, JG; 4 ♂, MS), 5 km E Swakopmund (1 ♀, ZMUC), 10 km E Swakopmund (1 ♀, MS), 15 km E Swakopmund (3 ♂; 2 ♀, 4 ♂, JG; 1 ♂, MS), 21 km E Swakopund on road to Usakos (2 ♂, AMG), 10 km N Swakopmund (7 ♀, 24 ♂; 10 ♂, AMG; 6 ♂, SAM), 50 km N Swakopmund (4 ♂), 113 km NNW Swakopmund (1 ♀, 27 ♂), 110 km NW Swakopmund (8 ♂, AMG), 114 km NW Swakopmund at 21°51′S 14°05′E (1 ♂, AMG), Uniab River mouth (2 ♂, AMG), 30 km E Walvis Bay (2 ♂, FSCA). **Walvis Bay District**: 11 km E Walvis Bay (5 ♀, 8 ♂), Walvis Bay to Swakopmund at 22°55′S 14°36′E (10 ♂, AMG).

Tachysphex theseus Arnold

Figures 384, 388.

Tachysphex theseus Arnold, 1951:156, ♀. Holotype: ♀, Ghana: Accra (BMNH), examined.— Bohart and Menke, 1976:277 (listed).

Recognition.— The female of *theseus* has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate and the apicoventral margin roundly prominent mesally; tarsomeres V angulate basoventrally, with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe; and on each leg one claw smaller than the other (Fig. 388c). Other species share these characteristics, but *theseus* differs in having a combination of well-defined mesopleural punctures that average about one diameter apart at center, long flagellomere I (dorsal length 2.4–2.8 × apical width), bicolored gaster (black except segments V and VI red), legs all or predominantly black, and setae erect or inclined posterad on the propodeal dorsum.

The male of *theseus* has the clypeal lobe corners closer to each other than to the respective orbit (Fig. 388b), sterna III–VI largely glabrous mesally, with large, sparse punctures, and the venter of apical tarsomeres with a preapical cluster of small spines in most specimens (Fig. 388d), with only one spine in some specimens. Other recognition features include: gaster black except tip red, femora and tibiae black, mesopleural punctures well defined, about one diameter apart, and forebasitarsus with at most two preapical rake spines (that are close to the apical spine).

Description.— Scutal punctures well defined, in female many discal punctures up to 2–3 diameters apart, in male averaging less than one diameter apart. Mesopleural punctures well defined but smaller than those on scutum, about one diameter apart at center; interspaces unsculptured or nearly so. Episternal sulcus nearly complete in female. Propodeal dorsum irregularly rugose, side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae suberect on each side of oral fossa next to occipital carina, about 0.4 × basal mandibular width; nearly erect on postocellar impression, slightly longer than midocellar diameter; nearly

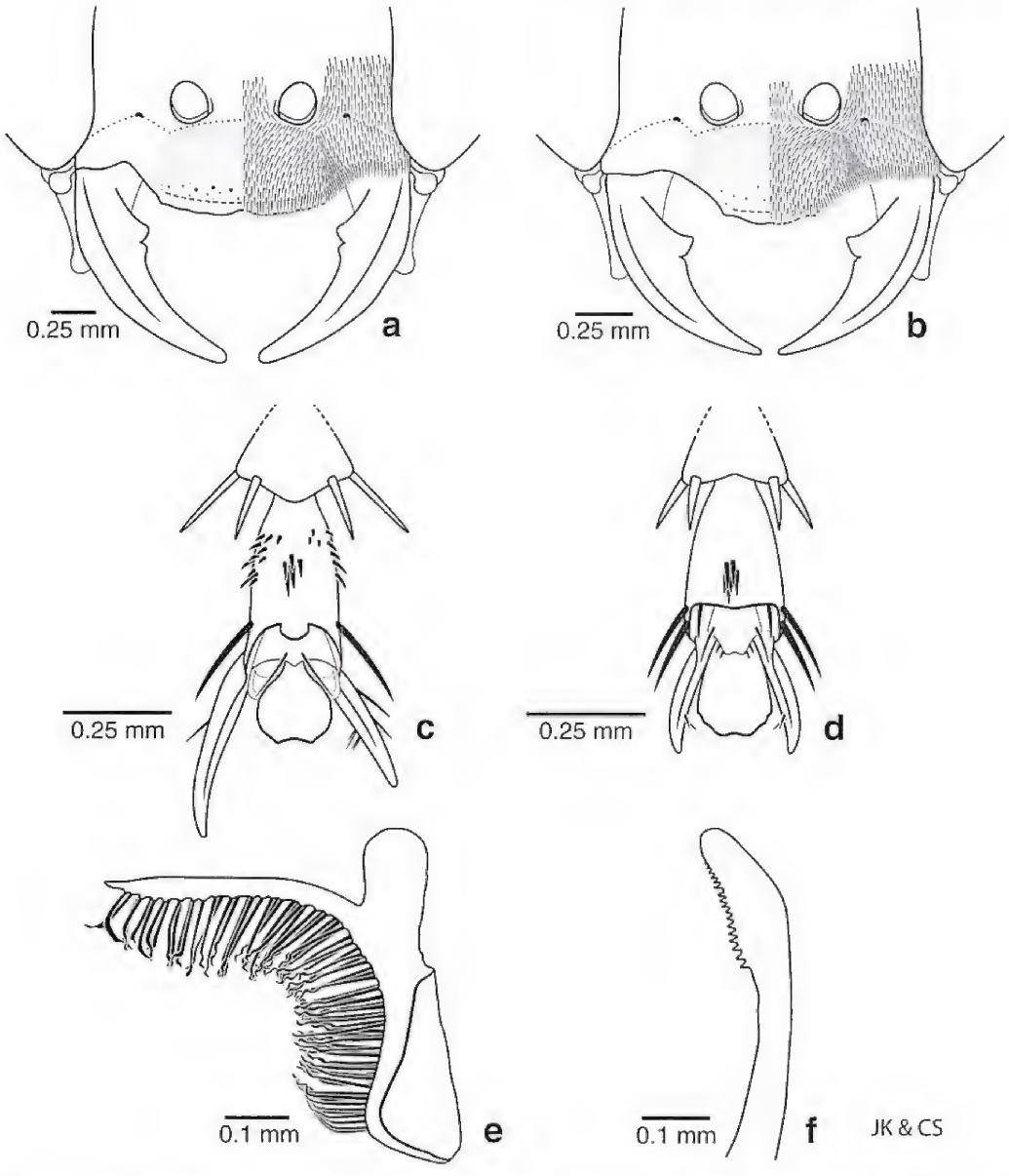


FIGURE 388. *Tachysphex theseus* Arnold: a – female clypeus and mandible; b – male clypeus and mandible; c – female hindtarsomeres IV and V in ventral view; d – male hindtarsomeres IV and V in ventral view; e – volsella; f – penis valve.

appressed posterad of postocellar impression; appressed on scutum; erect or inclined posterad on propodeal dorsum (basomedian setae inclined anterad in some males); on midfemoral venter suberect in female, suberect to subappressed in male, about as long as midocellar diameter.

Head and thorax black, mandible reddish mesally. Frontal and clypeal setae silvery in female, golden in male. Wing membrane slightly infumate; forewing costal and subcostal veins brown. Femora and tibiae black, but foretibial inner surface brown red in some females. Gaster black

except apex red (segments V and VI in female, in most males segments V–VII and sterna IV–VIII, but only tergum VII and sterna V–VIII in some). Terga I–III silvery fasciate apically.

♀.— Labrum emarginate mesally. Clypeus (Fig. 388a): bevel absent or rudimentary, markedly shorter than basomedian area; lip free margin arcuate, emarginate mesally, with two lateral incisions on each side. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 2.4–2.8 × apical width. Scutum and scutellum flattened. Midtrochanteral venter shiny, punctures several diameters apart. Forefemoral venter with minute punctures that are several diameters apart; interspaces aciculate. Dorsal foretibial surface with several suberect bristles; outer surface either evenly setose or with narrow, asetose zone, without spines or bristles or with one thin seta. Forebasitarsus with 10 or 11 rake spines, four or five apical spines with contiguous sockets. Tarsomeres III with apicoventral margin arcuate. Tarsomeres IV wider than long, with dorsoapical margin very broadly emarginate (almost straight), and apicoventral margin roundly prominent (Fig. 388c); outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; each lateral margin with row of small spines subbasally; apicoventral margin produced into lobe (Fig. 388c). Outer claws of mid- and hindtarsi shorter, thinner than inner claws (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures that average many diameters apart; interspaces practically unsculptured. Length 8.8–11.4 mm.

♂.— Mandible: trimmal carina with tooth and cleft. Clypeus (Fig. 388b): middle section flat, without bevel; lip free margin arcuate or minimally sinuate, with well-defined corner; distance between corners 0.6–0.7 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral notch finely setose. Outer margin of forebasitarsus with 0–2 preapical rake spines (when present, located next to apical one); outer apical spine of foretarsomere II markedly shorter than tarsomere III. Tarsomeres V each with preapical cluster of small spines on venter in most specimens (Fig. 388d), with one spine in some specimens. Sterna III–VI mesally with large punctures that are several diameters apart, thus sparsely setose. Sternum VIII: apical margin evenly emarginate or with mesal convexity. Length 8.5–10.2 mm. Volsella and penis valve: Figs. 388e, f.

Geographic distribution (Fig. 384).— Senegal to Ivory Coast and Togo.

Records.— GAMBIA: Fajara (1 ♂; 1 ♂, KMG). **GHANA**: Accra (1 ♀, BMNH, holotype of *theseus*), Kawampe 45 km N Kintampo at 8°30′N 1°35′W (1 ♂). **IVORY COAST**: Bouaké (1 ♀, 1 ♂, UCD), Bouaké: Foro-Foro (2 ♀, 1 ♂; 38 ♀, 72 ♂, UCD), Ferkessedougou (5 ♂). **SENEGAL**: Gîte de Bandiala, ca 13°38′N 16°38′W (1 ♂, KMG). **TOGO**: 5 km W Sokodé (2 ♀, 4 ♂).

Tachysphex thysanomerus Pulawski, sp. nov.

Figures 389–391.

Derivation of name.— *Thysanomerus* is derived from the Greek words *thysanos*, a fringe, and *meros*, thigh, femur, an allusion to the characteristic midfemoral setae of this species.

Recognition.— *Tachysphex thysanomerus* has a conspicuously convex labrum (markedly protruding beyond the clypeal free margin), elongate galea (length equal to 0.9–1.1 of scape), a ridged propodeal side, and an oblong upper metapleural pit. Unlike most other such species, the hindfemoral venter of *thysanomerus* is largely asetose in the distal half.

In addition, the female can be recognized from other such species by its straight genal, thoracic, and femoral setae that are suberect on the scutum anteriorly, and erect on the midfemoral venter (Fig. 389c). Setae are also erect on the midfemoral venter in *gastrotrichus*, *hadronyx*, and *tenuicornis*, but their genal and thoracic setae are sinuous (see these species for further differences).

The male of *thysanomerus* also differs from similar species in having an essentially truncate

middle clypeal lobe (Fig. 389b), the carinae that emerge from the lip corners being well defined, extending well above lip, and almost parallel to one another. Subsidiary recognition features are: scutal setae suberect anteriorly, sterna IV–VI each with a basal fringe of agglutinated, nearly erect setae (the fringes are visible only when the gastral segments are fully extended), and setae of midfemoral venter erect in many specimens.

DESCRIPTION.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, sparsely punctate, about as long as 0.9–1.0 of scape in female, 1.0–1.1 in male. Scutal punctures fine but well defined, averaging from about two to several diameters apart on scutum; interspaces shiny. Mesopleural punctures minute, averaging from about 2–3 to several diameters apart below scrobe, interspaces finely microsculptured but shiny. Propodeal dorsum microareolate and, in many specimens, with longitudinal ridges mesally; side ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate, carina minimally expanded basally.

Setae appressed or nearly so on postocellar area (suberect in many males), no longer than midocellar diameter; suberect on each side of oral fossa next to occipital carina (about 0.4 × basal mandibular width); suberect on scutum anteriorly; on propodeal dorsum diverging anterolaterad from midline except oriented anterad along midline in many females (oriented posterad near base); on midfemoral venter erect in female, suberect in distal half in many males but nearly appressed in some (Figs. 389c, d), setal length about equal to midocellar diameter.

Head largely black (see below for details). Frontal setae silvery in female, golden in male.

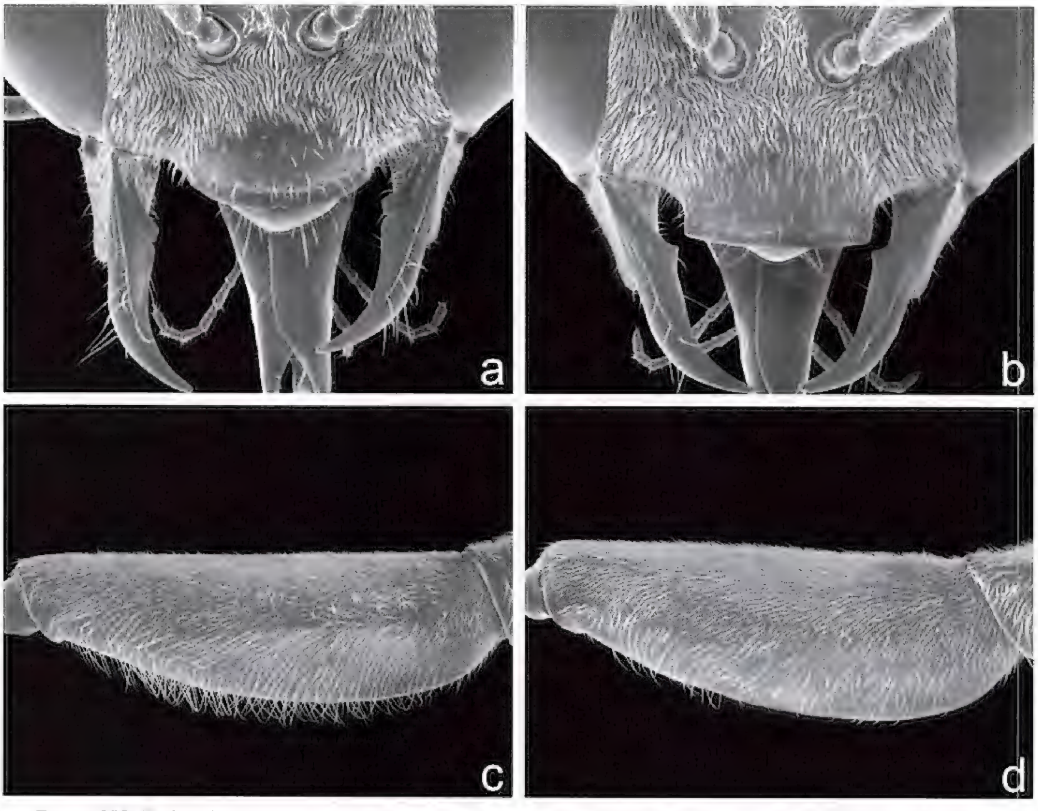


FIGURE 389. *Tachysphex thysanomerus* Pulawski, sp. nov.: a – female clypeus and mandible (×37); b – male clypeus and mandible (×42); c – female midfemur showing erect setae on venter (×55); d – male midfemur showing erect setae on venter (×59).

Thorax black, but pronotal lobe brown posteriorly in most males. Wing membrane hyaline; forewing costal vein yellowish, subcostal vein pale yellow. Femora black (except apically), tibiae and tarsi red. Gastral segments I and II or I–III red, remainder black (apical depressions of terga translucent). Terga I–V in female, I–VI in male, silvery fasciate apically.

♀.— Mandible: trimmal carina with evanescent tooth (Fig. 389a). Clypeus (Fig. 389a): bevel longer than basomedian area; lip free margin arcuate, not emarginate or slightly, shallowly emarginate mesally, lateral incision rudimentary or absent. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 3.2–3.7 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines. Forebasitarsus with six or seven rake spines. Midtrochanteral venter: punctures 2–3 diameters apart, interspaces shiny. Tergum V evenly micropunctate and setose, including apical depression. Pygidial plate varying: punctures averaging several to many diameters apart, interspaces conspicuously microsculptured to nearly unsculptured. Length 5.7–7.2 mm. Mandible varying from yellowish red (except basally and apically) to nearly all black; labrum and clypeal lip dark reddish; clypeal bevel varying from dark reddish to black.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 389b): bevel somewhat ill defined but at least as long as basomedian area; lip free margin minimally arcuate to minimally concave, mostly with evanescent median notch, with well-defined corner; distance between corners 1.3–1.5 × distance between corner and orbit. Width of postocellar area 1.1–1.3 × length. Dorsal length of flagellomere I 2.0–2.2 × apical width. Forefemoral notch microscopically setose, smaller than average for *Tachysphex*. Outer margin of forebasitarsus with 4–6 rake spines; outer apical spine of foretarsomere II markedly longer than tarsomere III. Sterna IV–VI (except laterally) each with subbasal fringe of agglutinated setae (fringes visible only when gaster is fully extended), with well-defined apical depression, and with apicolateral portion somewhat swollen and less densely punctate than remaining surface. Sternum VIII varying: apical notch wide (lateral prong sharp, thin) or narrow (lateral prong wider than average for the genus, as in Fig. 386c). Length 4.7–7.7 mm. Volsella and penis valve: Fig. 390. Mandible (except apically), labrum, and clypeal bevel and lip yellowish red.

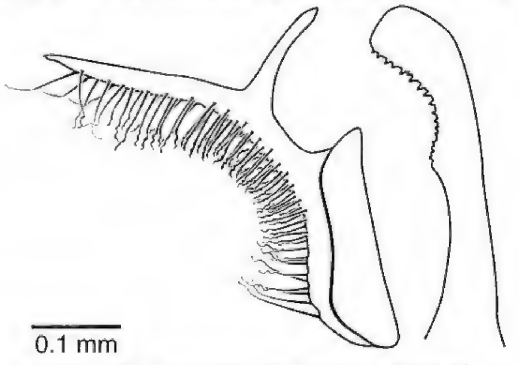


FIGURE 390. *Tachysphex thysanomerus* Pulawski, sp. nov.: volsella and penis valve.

FLORAL RECORD.— One male from 10 km N Swakopmund (AMG) was collected on flowers of *Brownanthus kuntzei* (Schinz) Ihlen. and Sittrich, a member of Aizoaceae, as noted by F.W. Gess and S.K. Gess, the collectors.

GEOGRAPHIC DISTRIBUTION (Fig. 391).— Namib Desert.

RECORDS.— HOLOTYPE: ♀, **NAMIBIA: Swakopmund District**: 10 km N Swakopmund at

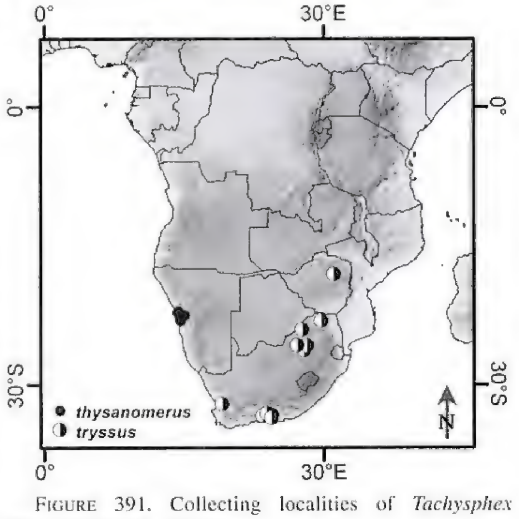


FIGURE 391. Collecting localities of *Tachysphex thysanomerus* and *tryssus*.

22°35′S 14°32′E, 16 Feb 1996, WJP (CAS). PARATYPES: **NAMIBIA**: **Swakopmund District**: Hentiesbaai, 18 Feb 1996, WJP (2 ♀, 14 ♂); 20 km NE Hentiesbaai at 21°58′S 14°22′E, 10 Dec 1996, WJP (11 ♂); Swakopmund, 12 Feb 1993, J. Gusenleitner (1 ♂, JG) and MS (4 ♂, MS); 15 km E Swakopmund, 8 Feb 1993, J. Gusenleitner (2 ♂, JG) and MS (1 ♂, MS); 10 km N Swakopmund, 16 Feb 1996, WJP (4 ♀, 4 ♂), 6 Dec 1996, WJP (1 ♀, 4 ♂), 21 Mar 1997, FSG (2 ♀, 2 ♂, AMG), 11 Apr 1998, FSG (1 ♂, AMG); 40 km NE Swakopmund, 5 Feb 1978, O. Lomholdt (1 ♀, ZMUC); 63 km NE Swakopmund, WJP, 15 Feb 1996 (5 ♂), 19 Feb 1996 (3 ♀, 3 ♂), 5 Mar 1996 (2 ♂), 5 Dec 1996 (2 ♀, 4 ♂), 9 Dec 1996 (2 ♀, 8 ♂). **Walvis Bay District**: 11 km E Walvis Bay, 7 Dec 1996, WJP (1 ♂).

Tachysphex titania Arnold

Figures 392–394.

Tachysphex titania Arnold, 1923:163, ♀, ♂ (as *Titania*, incorrect original capitalization). Lectotype: ♀, Zimbabwe: Bulawayo (SAM), **here designated**, examined.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex titania var. *willowmorensis* Arnold, 1924:55, ♀, ♂. Lectotype: ♂, South Africa: Eastern Cape Province: Willowmore (TMP), **here designated**, examined. **New synonym.**— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae).— As *Tachysphex titania willowmorensis*: Bohart and Menke, 1976:277 (new status, listed).

RECOGNITION.— *Tachysphex titania* has the gaster, femora, and tibiae black; mesopleuron shiny, with well-defined punctures (that are less than one diameter apart); setae erect on postocellar area (Figs. 392a, b), nearly erect on scutum and midfemoral venter, and inclined obliquely anterad on propodeal dorsum; labrum flat, not emarginate; and apical tarsomeres without spines on venter or lateral margins. Other species are similar, but *titania* differs in having a galea slightly longer than wide in profile (Fig. 393) rather than equal to width or shorter, a character that can be seen only when the mouthparts are not retracted. Unlike *longipes*, the setae of the hindfemoral venter are appressed in *titania* (rather than erect), and the apical tarsomeres are not elongate (length of hindtarsomere IV 1.2–1.3 × apical width rather than 2.5 in the female and 1.5 in the male, respectively).

The female of *titania*, in addition, has the clypeal free margin evenly convex, not incised laterally (Fig. 392c) and in most specimens evenly arcuate (roundly prominent mesally in *hermia*), apical portion of the galea (distad of crease) sparsely punctate (densely punctate in *hermia*), postocellar area flat or nearly so (concave in *angustus* and *longipes*), and mesopleuron punctate, with shiny interspaces (punctatorugose, dull in *longipes*).

Like *diversilabris*, *hermia*, and *longipes*, the male of *titania* has a pointed clypeal lobe (Fig. 392d). It has evenly sculptured flagellomeres (middle flagellomeres with longitudinal sulcus in *diversilabris*), and the oblique carina that emerges from the clypeal midpoint does not end as a tubercle (a minute tubercle is present in *hermia*). Also, the forebasitarsus either has no preapical rake spines (as in the other species) or the spines are present (unlike these species).

SIMILAR UNASSIGNED SPECIMENS.— Two females and two males from Namaqualand, South Africa (CAS), closely resemble *titania* (including the shape of the galea), but differ in having unusually long, sinuous setae on the head and thorax (setal length, on postocellar area, about 1.3 × basal mandibular width). The width of postocellar area is as in *titania* in one of the females, but 3.2–3.5 × length in the other three specimens. Most likely, they are just extreme variants of *titania* adapted to Namaqualand cold weather conditions, but I have not seen intergradation. The difference in the width of postocellar area between the two topotypical females is also perplexing. The specimens were collected in Northern Cape Province of South Africa: Dassiefontein Farm 14 road km E

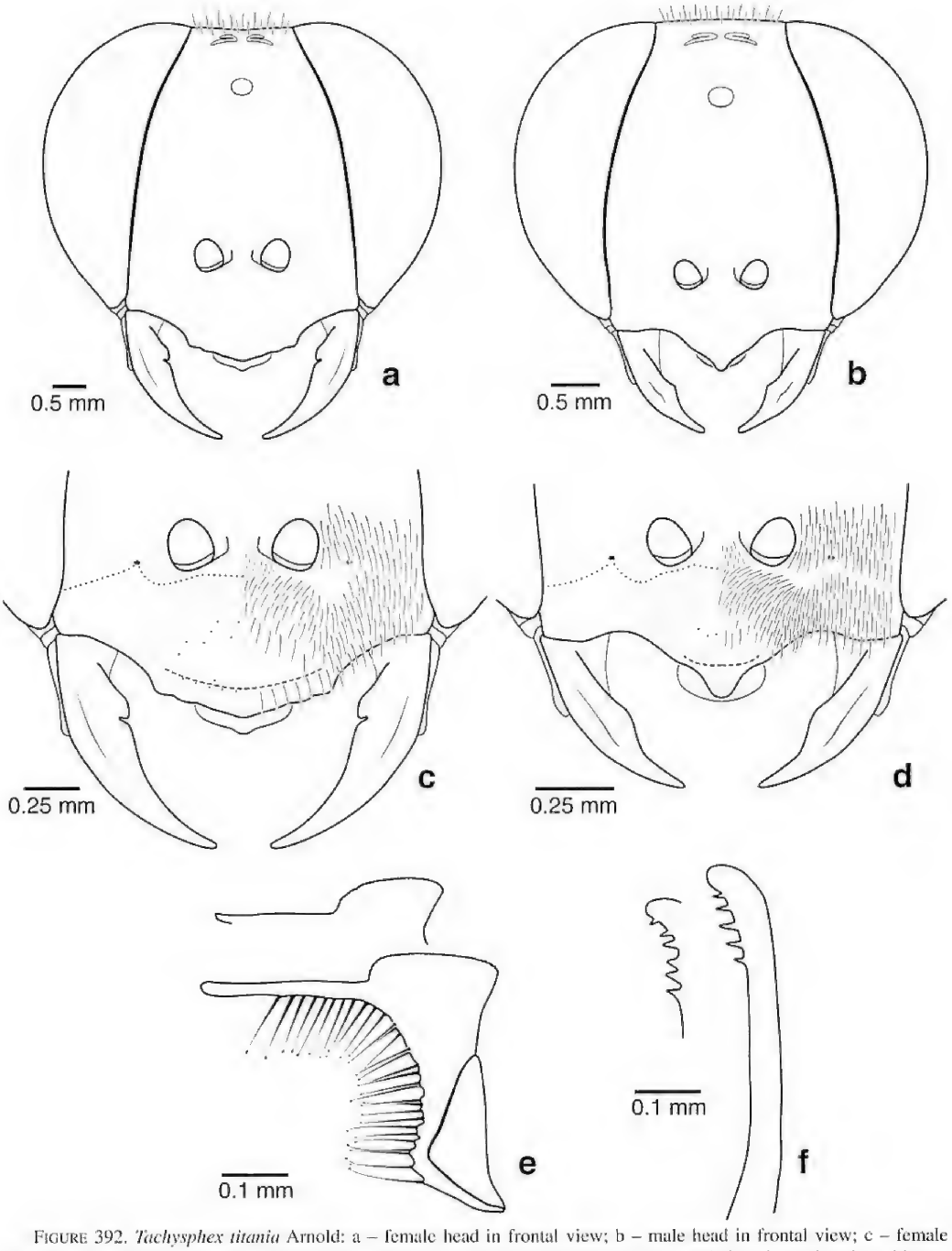


FIGURE 392. *Tachysphex titania* Arnold: a – female head in frontal view; b – male head in frontal view; c – female clypeus and mandible; d – male clypeus and mandible; e – volsella with outline showing variation; f – penis valve with outline showing variation.

Kamieskroon at 30°09.3′S 17°59.6′E, 16–17 Sept 2001 (2 ♀); 23 and 90 km ENE Springbok at 29°33.0′S 18°11.6′E and 29°20.1′S 18°44.3′E, 19 Sept 2001 (2 ♂).

Justification of new synonymy – Arnold's (1924) var. *willowmorensis* is characterized by the presence, in the male, of a well-developed foretarsal rake. Such males occur mainly in the Karoo Desert but also in the Bulawayo area, Zimbabwe, and there appears to be a continuous spectrum of intermediate forms (see Variation below for details). For this reason I treat *willowmorensis* as a synonym of *titania*.

Figure 393. *Tachysphex titania* Arnold: galea in lateral view (×140).

Description.— Galea in profile slightly longer than wide, with apical portion (distad of crease) sparsely punctate, about as basal portion (Fig. 393). Mandible: outer ridge somewhat swollen and expanded over notch. Scutal and mesopleural punctures well defined, averaging less than one diameter apart (some scutal punctures 2–3 diameters apart, some mesopleural punctures exceptionally more than one diameter apart). Propodeal dorsum irregularly, coarsely ridged, side ridged. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area (Figs. 392a, b), curved posterad or sinuous on scutum anteriorly (also sinuous on mesopleuron in one female from Willowmore); inclined anterad on propodeal dorsum; setal length (expressed as a fraction of basal mandibular width) 0.3–0.4 on postocellar area and on each side of oral fossa next to occipital carina, 0.3–0.5 on scutum anteriorly.

Head, thorax, legs, and gaster black, mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane moderately infumate to nearly hyaline, forewing costal and subcostal veins brown. Terga I–III or I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 392c): bevel longer mesally than basomedian area; lip free margin not incised laterally, evenly arcuate in most specimens, but with obtuse, median projection if female from Brandberg Plateau, Namibia. Width of postocellar area 1.9–2.1 × length (Fig. 392a). Dorsal length of flagellomere I 2.4–2.6 × apical width. Forefemoral venter with minute punctures that are up to several diameters apart. Dorsal foretibial surface uniformly setose or with several suberect, inconspicuous bristles; outer surface with one spine near midlength. Forebasitarsus with six or seven rake spines. Apical depression of tergum V setose throughout. Length 5.5–10.0 mm.

♂.— Mandible: trimmal carina roundly expanded but not dentate, without cleft (Fig. 392d). Clypeus (Fig. 392d): bevel ill defined, with an oblique, ill-defined carina that emerges from clypeal midpoint and is nearly parallel to clypeal free margin (carina almost effaced in smallest specimens); lip free margin pointed (acutely so in most specimens, obtusely in some), without well-defined corner, forming single curved line with rest of clypeal margin. Width of postocellar area 2.3–2.4 × length (Fig. 392b). Dorsal length of flagellomere I 1.6 × apical width. Forefemoral notch microscopically setose. Foretarsal rake: see Variation below. Length 4.5–7.6 mm. Volsella and penis valve: Figs. 392e, f.

Variation.— Most males have no preapical spines on the outer side of the forebasitarsus, but such spines are present in many individuals from the Karoo Desert and Bulawayo area, Zimbabwe. In some cases, there is only one preapical spine, placed near the tarsomere midlength (on one leg only in some specimens, or the spine is replaced by a seta on the opposite leg); the spine length is about equal to the basitarsus width. In other cases, there are 2–5 such spines, and their length may exceed the basitarsus width. The outer apical spine of foretarsomere II is shorter than tarsomere III in most specimens, but it may be longer in specimens with two or three preapical spines on tarsomere I.

Prey.— A female from Richtersfeld National Park, South Africa, was collected with her prey, a nymphal pyrgomorphid (det. F.W. Gess).

Geographic distribution (Fig. 394).— Botswana, Zimbabwe, Namibia, South Africa (including Lesotho and Swaziland).

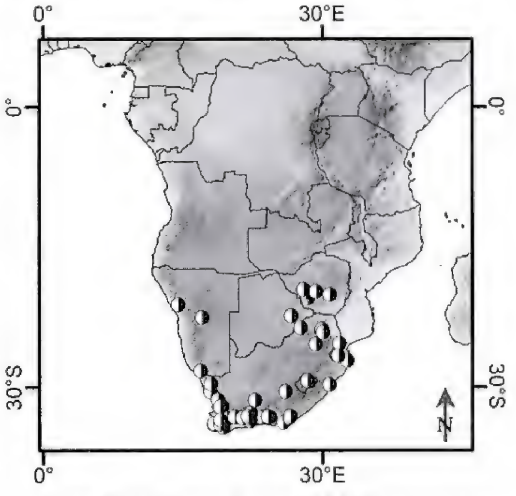


Figure 394. Collecting localities of *Tachysphex titania*.

Records.— **BOTSWANA**: Serowe (1 ♂). **LESOTHO**: Bokong P.O. (1 ♀, AMG). **NAMIBIA**: **Khorixas District**: Brandberg (determined as Species 1 by van Noort, Prinsloo, and Compton, 2000): Hungorob River mouth (2 ♂, SAM), Messum Valley (1 ♀, 1 ♂; 3 ♀, 1 ♂, SAM), Plateau valley (1 ♀, SAM), and Wasserfallfläche (1 ♂, SAM, determined as Species 3 by van Noort, Prinsloo, and Compton, 2000). **Windhoek District**: Windhoek (1 ♂, NMN). **SOUTH AFRICA**: **Eastern Cape Province**: Algoa Bay (1 ♀, TMP), Fullerton near Willowmore (1 ♀, AMG), Grahamstown (1 ♀, PPRI), Resolution 17 air km NNE Grahamstown (1 ♀, SAM), 6 km N Steytlerville (1 ♀, 1 ♂, USU), Willowmore (1 ♂, AEI: 1 ♂, SAM, paratype of *titania willowmorensis*; 2 ♀, 1 ♂, TMP, including lectotype and paralectotype of *titania willowmorensis*), 37 km NW Willowmore in Grootrivierberg Range (1 ♂, USU). **Free State**: Caledon River between Bethulie and Aliwal North (1 ♀, SAM). **Kwazulu-Natal**: 20 km S Emanguzi (1 ♀, OÖLM), Kloof (2 ♂, BMNH). **Mpumalanga**: Crocodile Bridge in Kruger National Park (1 ♀, PPRI), Loskop Dam Nature Reserve (1 ♂, PPRI). **Northern Cape Province**: Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♂, PPRI), Garies (2 ♂, AEI), Goegap Nature Reserve (1 ♀, AMG), Melton Wold (1 ♀, SAM), Richtersveld National Park at 28°18′S 16°57′E (1 ♀; 1 ♀, AMG). **Northern Province**: Ellisras (1 ♂; 3 ♀, 1 ♂, AMG), Magoebaskloof at 23°51′S 30°02′E (1 ♀, AMG), Malta Forest between 24°00′ and 24°15′S and 30°00′ and 30°15′E (1 ♀, AMG). **Western Cape Province**: Cape Town: Constantiaberge above Tokai Forest and Donkerboskloof, 460 m alt., at 34°02′S 18°23′E (1 ♀, SAM), Cape Town: Table Mountain at 33°57′S 18°24′E (1 ♀) and 33°58′S 18°25′E (1 ♀, 3 ♂), Clanwilliam (1 ♀, USU), Clanwilliam District: Biedouw Valley (1 ♀, 2 ♂, PPRI), Hermanus: Fernkloof Nature Reserve (1 ♀, SAM), SW side of Hexriver Pass (1 ♀, BMNH), Hottentots Kloof (1 ♂, UCD), Knersvlakte: Kaap se Drif Farm at 31°26′01″S 18°47′34″E (1 ♀, OHL), Lammerskraal in Prince Albert District (1 ♀, SAM), Matjiesfontein at 33°14′S 20°35′E (1 ♂, BMNH), Oudtshoorn-Zebra (1 ♂, SAM), Pakhuis Pass (1 ♂, UCD), Seweweekspoort (1 ♀, UCD), Swartberg Pass (1 ♂, BALDOCK), Swartrivier 7 km NW Prince Albert (1 ♀), 9 mi NE Wellington (1 ♀, USNM). **SWAZILAND**: Mhlangate River near Phuzumoya (1 ♂, ZMAN). **ZIMBABWE**: Bulawayo (2 ♀, 2 ♂, SAM, including lectotype ♀, paralectotype ♂, and 1 paratype ♂ of *titania*), Great Zimbabwe (1 ♀, AMG), Kami Ruins (1 ♂), Matobo (1 ♂, SAM), Nyamandhlovu (1 ♂, TMP), Sawmills (2 ♂, SAM), Shangani: De Beer's Ranch (1 ♂, BMNH), World's View (now Malindidzimu) in Matobo National Park (1 ♀, SAM; 1 ♀, TMP).

***Tachysphex tryssus* Pulawski, sp. nov.**
Figures 391, 395.

DERIVATION OF NAME.— *Tryssus* is derived from *tryssos*, Greek for dainty, delicate.

RECOGNITION.— *Tachysphex tryssus*, an all black southern African species, has well-defined mesopleural punctures (coarse and compressed against each other in many specimens), a flat labrum, a galea longer than wide in profile, and erect setae on the postocellar area. The unusually narrow clypeal lip is distinctive: the corners are equidistant from each other and the adjacent orbit in the female (Fig. 395a) and closer to each other than to the adjacent orbit in the male (Figs. 395b). Subsidiary recognition features in the male are: trimmal carina with an unusually large tooth (Fig. 395b) and apical margin of sternum VIII tridentate (Fig. 395c).

DESCRIPTION.— Galea longer than wide in profile, as long as 0.8 of scape. Supraantennal swelling ill defined. Scutum with well-defined punctures that are up to about one diameter apart on disk in female, less than one diameter apart in male; in many specimens with short, longitudinal ridges next to hindmargin. Mesopleural punctures well defined, varying from about one diameter apart beneath scrobe to coarse and compressed against each other. Propodeal dorsum irregularly ridged longitudinally, somewhat prominent apicomesally; side ridged. Hindcoxal dorsum with inner margin carinate basally, carina somewhat expanded.

Setae erect on each side of oral fossa next to occipital carina (setal length about 0.25 × basal mandibular width in female, about one midocellar diameter in male); erect on postocellar area (slightly longer than midocellar diameter), subappressed on scutum; varying on propodeal dorsum: either oriented obliquely anterad, or oriented obliquely anterad and obliquely posterad on the sides and joining apicomesally, or oriented posterad.

Head, thorax, legs, and gaster black, mandible dark red in some specimens; tarsal apex dark brown. Frontal setae silvery in both sexes. Wing membrane slightly infumate; forewing costal and subcostal veins dark brown. Terga I–IV silvery fasciate apically.

♀.— Clypeus (Fig. 395a): bevel longer than basomedian area; lip markedly arcuate, not incised laterally; lip corners equidistant from each other and respective orbit. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Dorsal foretibial surface with two spines; outer surface with erect bristle near midlength. Forebasitarsus with 8–11 rake spines. Apical depression of tergum V punctate and setose throughout. Pygidial plate aciculate, sparsely punctate. Length 7.7–8.5 mm.

♂.— Mandible: trimmal carina with conspicuous tooth, without cleft. Clypeus (Fig. 395b): bevel about as long as basomedian area; lip free margin arcuate, with corner well defined to rounded; distance between corners 0.6 × distance between corner and orbit. Width of postocellar area 1.1–1.4 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Sternum VIII tridentate apically, conspicuously so in most specimens (Fig. 395c). Length 6.0–7.0 mm. Volsella and penis valve: Figs. 395d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 391).— Zimbabwe, South Africa.

RECORDS— HOLOTYPE: ♀, **SOUTH AFRICA**: **Northern Province**: Happy Rest Nature Reserve at 22°59′S 29°46′E, 10 Mar 1990, CDE (PPRI). PARATYPES (ISP = M.E. Irwin, E.I. Schlinger, F.D. Parker): **SOUTH AFRICA**: **Eastern Cape Province**: 6 km N Steytlerville, 16–23 Nov 1999, ISP (1 ♂; 1 ♂, USU); 30 km S Steytlerville: Wolwekraal Farm, 22 Nov 1999, ISP (1 ♂, USU); 43 km NE Willowmore: Plessierivier, 18–22 Nov 1999, ISP (1 ♂, USU); 37 km NW Willowmore in Grootrivierberg Range at 33°11.5′S 24°09.5′E, 19–24 Nov 1999, ISP (1 ♂; 1 ♂, USU); 11 km SW Willowmore at 33°22.3′S 23°24.7′E, 20–24 Nov 1999, ISP (1 ♂, USU). **Gauteng**: Johannesburg: Melville Koppies Reserve, 15–30 Mar 1987, W. Miller (2 ♂, FSCA); Pretoria E, 22 Mar 1990, MS (2 ♂). **Northern Province**: Happy Rest Nature Reserve at 22°59′S 29°46′E,

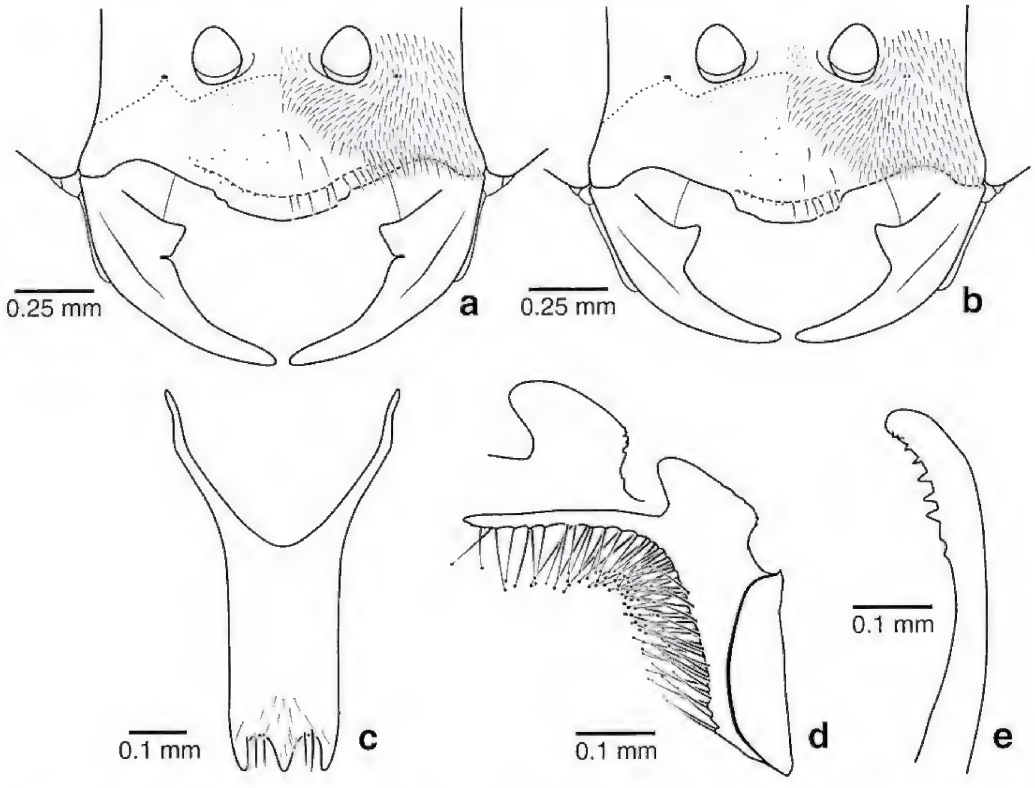


FIGURE 395. *Tachysphex tryssus* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – male sternum VIII; d – volsella with outline showing variation of dorsal process; e – penis valve.

10 Mar 1990, CDE (3 ♂, PPRI); Mogol Nature Reserve, 25–26 Jan 1982, M.W. Mansell (1 ♂, PPRI); same locality, 27–29 Feb 1984, CDE (2 ♂; 1 ♀, 2 ♂, PPRI). **North-West Province**: Rustenburg Nature Reserve, 17–20 Mar 1980, CDE, W.A. Harrop, and C.G. Moolman (1 ♀, 2 ♂; 2 ♂, PPRI). **Western Cape Province**: 40 km E Clanwilliam: Sevilla, 27–28 Nov 1999, F.D. Parker (1 ♂, USU). **ZIMBABWE**: Mbizi Game Reserve (= Rocky Farm) 20 km SE Harare, 5 Aug 1997, WJP (1 ♂).

Tachysphex ulonyovu Pulawski, sp. nov.

Figures 396, 397.

DERIVATION OF NAME.— *Ulonyovu*, a Ndebele word meaning wasp; a noun in apposition.

RECOGNITION.— The female of *ulonyovu* has unusually short tarsi (length of midtarsomere II less than twice apical width, length of midtarsomere III 1.2 × apical width), partly red gaster and red legs, and middle flagellomeres with characteristic sensory areas (as in Figs. 38c-e). This combination is shared with *asinus*, *onager*, and *scaber*, but in *ulonyovu* the labrum is flat and broadly emarginate (rather than convex apically and entire), the propodeal side is not ridged (rather than ridged), and the apical flagellomeres are slightly longer (e.g., length of VII equals 1.2 its width rather that 1.0).

The male can be recognized by the following combination: free margin of clypeal lobe prominently arcuate (Fig. 396b), tarsi short (e.g., length of midtarsomere III 1.5–1.6 × apical width, that of midtarsomere IV equal to apical width), labrum broadly emarginate to truncate, setae inclined

posterad on the propodeal dorsum and appressed on sterna, gaster and legs partly red, and wings yellowish (insignificantly darkened in the distal third).

Description.— Galea about as long as wide in lateral view, about as long as 0.6 of scape, with well-defined punctures that are several diameters apart (at least anteriorly). Labrum broadly emarginate, truncate in some males. Supraantennal swelling punctate in some specimens. Scutal punctures fine, no more than one diameter apart in female, nearly contiguous in male. Mesopleuron dull, conspicuously microsculptured, with ill-defined punctures. Episternal sulcus complete, effaced anteroventrally in some males. Propodeal dorsum evenly microareolate, side uniformly microsculptured, not ridged. Vein cu-a in hindwing varying: anal end either closer to or further away from wing base than cubital end. Hindcoxal dorsum with inner margin carinate basally. Sternum I with apical depression bisected by obtuse carina.

Setae erect on postocellar area, no longer than midocellar diameter; about equal to midocellar diameter on each side of oral fossa next to occipital carina; appressed on scutum; pointing posterad on propodeal dorsum.

Head and thorax black, mandible reddish mesally. Frontal setae silvery in both sexes. Wing membrane yellow, somewhat darkened in distal third; forewing costal and subcostal veins reddish brown. Femora, tibiae, and tarsi red, male femora black basally (at least fore- and midfemora). Gastral segments I and II red, remainder black (segment I black, with preapical transverse red spot on tergum in male from Harare area, Zimbabwe). Terga I–III silvery fasciate apically.

♀.— Labrum flat, emarginate apically. Clypeus (Fig. 396a): bevel about as long as basomedian area, unsharply delimited from the latter; lip free margin markedly arcuate, with two lateral incisions on each side (inner incision ill defined in some specimens). Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.4–1.7 × apical width. Forefemoral venter, in apical half, with minute, sparse punctures and unsculptured interspaces. Dorsal foretibial surface with several inconspicuous, suberect bristles; outer surface sparsely punctate and setose, with two or three thin spines. Tarsi short: length of fore- and midtarsomeres II about 1.3–1.4 and 1.7–1.8 × apical width, respectively; that of midtarsomere III 1.2 × apical width; of fore-, mid-, and hindtarsomeres IV about 1.0, 0.9, and 1.0 × apical width, respectively. Forebasitarsus with 11–13 rake spines. Apical tarsomeres stout, with 1–3 (mostly two) preapical ventral spines; lateral margins, in most specimens, with small spine behind midlength. Apical depression of tergum V impunctate and glabrous (except mesally). Pygidial plate emarginate apically, in most specimens finely punctate mesally (punctures less than one diameter apart), lateral punctures larger, at least one diameter apart (Fig. 396c); but all punctures large, averaging more than one diameter apart, in single female from Redbank, Zimbabwe. Length 10.0–13.0 mm.

♂.— Mandible: trimmal carina with tooth and cleft (tooth rudimentary in some specimens). Clypeus (Fig. 396b): bevel shorter than basomedian area, unsharply delimited from the latter; lip free margin obtusely pointed, with corner present but ill defined; distance between corners 0.9 × distance between corner and orbit. Width of postocellar area 1.0–1.2 × length. Dorsal length of flagellomere I 1.2–1.3 × apical width. Forefemoral notch microscopically setose, slightly smaller than average for the genus. Posteroventral midfemoral surface impunctate or with punctures that are many diameters apart. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Length of midtarsomere III 1.5–1.6 × apical width, that of midtarsomere IV equal to apical width. Venters of tarsomeres V each with one or two minute, preapical spines. Sternum VIII apically tridentate or at least convex mesally. Length 7.0–10.0 mm. Volsella and penis valve: Figs. 396d, e.

Geographic distribution (Fig. 397).— Zimbabwe to eastern South Africa.

Records— Holotype: ♀, **ZIMBABWE**: Victoria Falls at 17°56′S 25°50′E, 1–8 Feb 1996, WJP

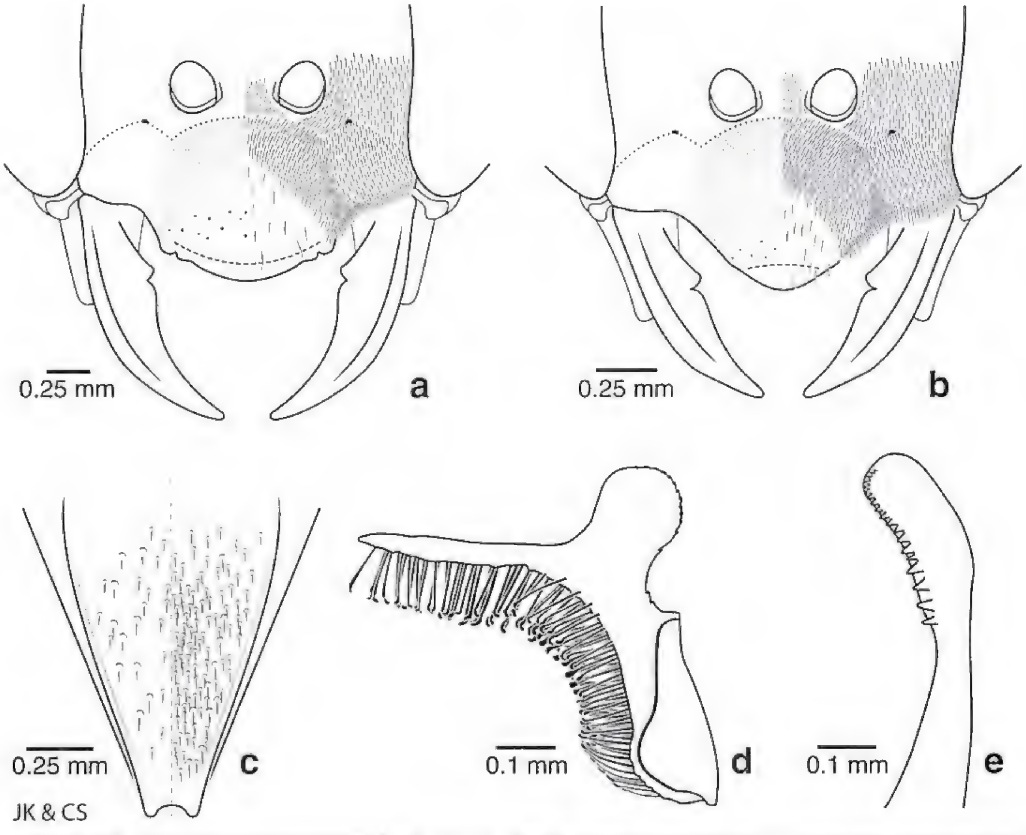


FIGURE 396. *Tachysphex ulonyovu* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – pygidial plate of female showing individual variation; d – volsella; e – penis valve.

(CAS). PARATYPES: **SOUTH AFRICA**: **Kwazulu-Natal**: St. Lucia: Fannies Island Campground at 28°10′S 32°25′E, 14–16 Jan 1981, R.P. Oberprieler (1 ♂, PPRI); St. Lucia Estuary, 15 Jan–15 Feb 1978, D.J. Brothers (2 ♂, PMA); Tembe Elephant Park, 30 Nov 2002, Marek Halada (1 ♀, OÖLM). **Mpumalanga**: Pretoriuskop in Kruger National Park, 17 Jan 1985, CDE (1 ♀, PPRI); Skukuza in Kruger National Park, 12–15 Dec 1985, W.R. Mason (1 ♂; 1 ♀, 3 ♂, PMA), S. and J. Peck (3 ♀; 4 ♀, PMA), M. Sanborne (1 ♀; 1 ♂, PMA). **Northern Province**: D'Nyala Nature Reserve, 8–12 Dec 1989, CDE (1 ♂); Guernsey Farm 15 km E Klaserie, 19–31 Dec 1985, H. and A. Howden (2 ♀, 3 ♂, PMA), S. and J. Peck (1 ♀, 2 ♂; 2 ♀, 2 ♂, PMA), M. Sanborne (1 ♀, 3 ♂; 3 ♀, 9 ♂, PMA); Klaserie Hongony, 25 Dec 1985, W.R. Mason (1 ♀, PMA); Modjadji Nature Reserve, 13–14 Jan 1987, V.M. Uys (1 ♂, PPRI); Mogol Nature Reserve, 19–23 Nov 1979, S.J. van Tonder, C. Kok, G.L. Prinsloo, M.W.

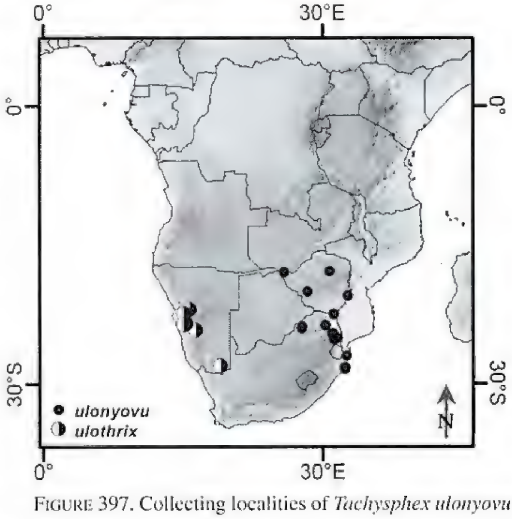


FIGURE 397. Collecting localities of *Tachysphex ulonyovu* and *ulothrix*.

Mansell (1 ♂, PPRI); Pafuri in Kruger National Park, 23 Sept 1984, L.E.O. Braack (1 ♂, PPRI). **ZIMBABWE**: 30 km W Harare, 29 Nov 1998, M. Halada (1 ♂, OÖLM); Mt. Selinda 40 km S Chipinge, 13 Dec 1998, M. Halada (1 ♂); Redbank at Kami River, WJP, 30 Jan 1995 (1 ♀, 1 ♂) and 1 Jan 1996 (1 ♂); T.R.S. [= Trelawney Research Station WNW Harare], 20 Jan 1984, N.J.M. [= N.J. Myers] (1 ♀, AMG); Victoria Falls, 1–8 Feb 1996 and 28–31 Mar 1998, WJP (2 ♀).

***Tachysphex ulothrix* Pulawski, sp. nov.**
Figures 397–399.

Derivation of name.— *Ulothrix* is derived from two Greek nouns: *oulos*, wool, and *thrix*, hair; an allusion to the dense, sinuous setae of this species; a noun in apposition.

Recognition.— *Tachysphex ulothrix* shares the following combination with *gastrotrichus*: labrum convex, protruding beyond clypeal free margin; galea about as long as scape; propodeal side ridged; hindfemoral venter asetose in distal half or so; and setae sinuous (suberect to erect) on gena, most of the thorax, and fore- and midfemoral venters (Figs. 398c, d), but contrastingly straight and appressed on postocellar area (mesopleural setae largely concealing integument). In *ulothrix*, however, the setae are also appressed or nearly so on tergum I, and the male forefemur is emarginate (Fig. 398d), whereas in *gastrotrichus* setae are erect on the basal declivity of tergum I and the male forefemur is entire.

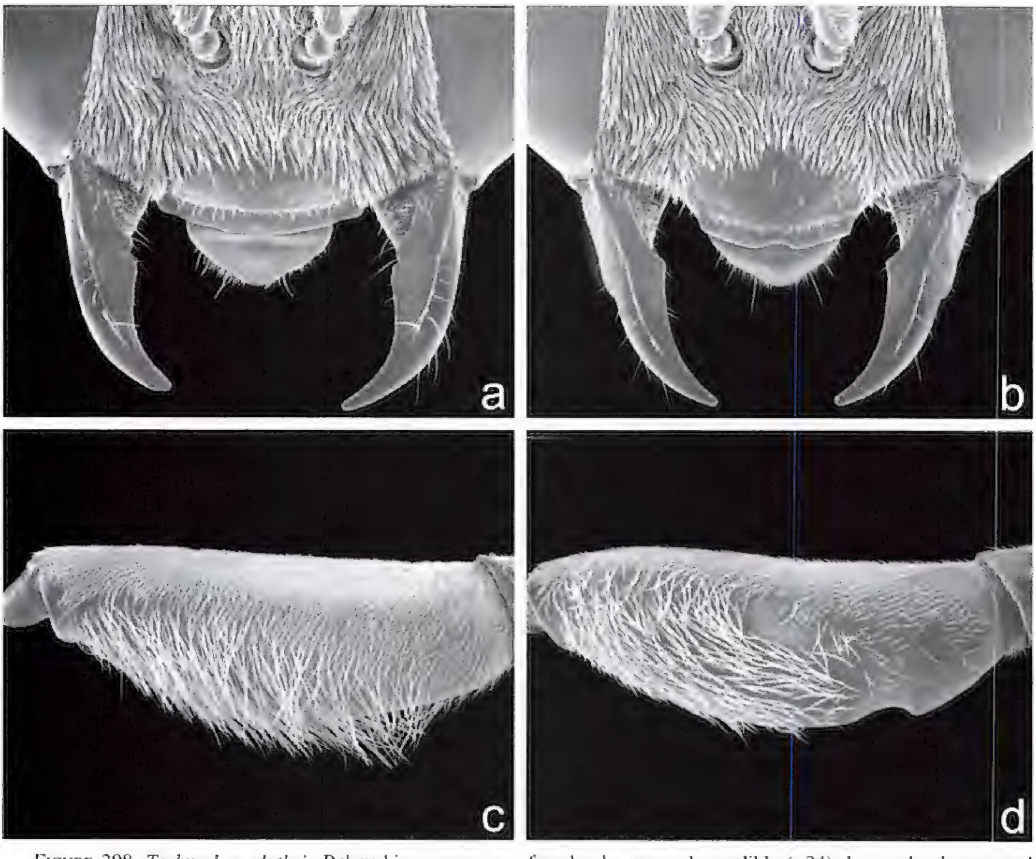


Figure 398. *Tachysphex ulothrix* Pulawski, sp. nov.: a – female clypeus and mandible (×34); b – male clypeus and mandible (×40); c – female forefemur (×46); d – male forefemur (×60).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, sparsely punctate, markedly longer than wide in profile, as long as 0.9 of scapal length in female, as 1.0 in male. Scutum and mesopleuron with well-defined punctures and shiny interspaces; punctures up to 2–3 diameters apart on scutal disk, on mesopleuron averaging about one diameter apart. Propodeal dorsum longitudinally ridged, but ridges evanescent laterally in many specimens; side with well-defined ridges; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate, carina not expanded.

Setae (setal length expressed as a fraction of basal mandibular width): fully concealing integument on frons, nearly so on mesopleuron in female; sinuous on gena, scutum anteriorly, mesopleuron, propodeal dorsum, and fore- and midfemoral venters (Figs. 398c, d); erect on lower gena (length about 0.7) and scutum anteriorly (length about 0.7 in female, 0.9–1.0 in male), subappressed on forefemoral venter, subappressed on scutal disk, appressed on postocellar area, essentially erect on propodeal dorsum (length about 0.5). Hindfemoral venter glabrous in distal half or so.

Head and thorax black, but mandible (except apically) yellowish red; clypeal bevel, clypeal lip, and labrum yellowish; and pronotal lobe yellowish or reddish apically. Frontal setae silvery in both sexes. Wings hyaline; forewing costal vein yellowish, subcostal vein light brown. Fore- and midfemora red except black dorsally, apical quarter or third all red; hindfemur all red except black basodorsally in some specimens. Tibiae and tarsi red. Gaster red. Terga I–V silvery fasciate apically.

♀.— Clypeus (Fig. 398a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, neither incised nor sinuous laterally. Width of postocellar area 0.8–0.9 × length. Dorsal length of flagellomere I 2.8–3.0 × apical width. Base of forefemoral venter with punctures varying from about one to many diameters apart. Dorsal foretibial surface with three or four spines; outer margin with two spines. Forebasitarsus with 8–10 rake spines. Apical depression of tergum V closely punctate and setose throughout. Length 8.0–10.0 mm.

♂.— Mandible: trimmal carina with low tooth, without cleft. Clypeus (Fig. 398b): bevel longer than basomedian area; lip free margin arcuate; corners rounded, about equidistant from each other and respective orbit. Width of postocellar area 1.0 × length. Dorsal length of flagellomere I 2.0–2.2 × apical width. Forefemoral notch smaller than average for the genus (Fig. 398d), unsculptured, glabrous. Outer margin of forebasitarsus with five rake spines; outer apical spine of foretarsomere II markedly longer than tarsomere III. Hindfemoral venter with inner (= posterior) margin sharp in distal half. Sterna III–VI (except laterally) each with subbasal, erect fringe of agglutinated setae, although fringe is ill developed on sternum III (fringes visible only when segments are fully extended). Sternum VIII broadly emarginate apically. Length 6.0–8.8 mm. Volsella and penis valve: Fig. 399.

Floral records.— The female from SE Büllsport was collected on flowers of *Limeum sulcatum* (Klotsch) Hutch. (Molluginaceae), as recorded by F.W. and S.K. Gess, the collectors.

Geographic distribution (Fig. 397).— Namibia.

Records.— Holotype: ♀, **NAMIBIA: Karibib District**: 65 km SW Usakos, 1 Mar 1990, WJP (CAS). Paratypes: **NAMIBIA: Karasburg District**: 30 km E Karasburg, 12 Mar 1997, FSG

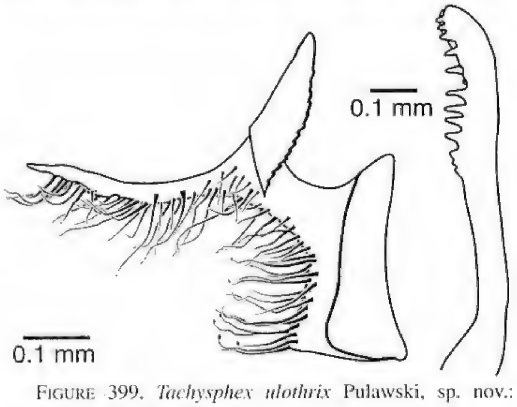


Figure 399. *Tachysphex ulothrix* Pulawski, sp. nov.: volsella and penis valve.

(1 ♂, AMG). **Karibib District**: 15 km W Karibib, 28 Feb 1990, WJP (1 ♀); 97 km from Swakompund on road to Usakos, 16 Mar 2000, FSG (2 ♂, AMG); 55 km SW Usakos, 1 Mar 1990, WJP (2 ♀); 65 km SW Usakos, 1 Mar 1990, MS (1 ♀, 1 ♂; 2 ♀, MS), WJP (1 ♀). **Maltahöhe District**: SE Büllsport 4 km from road C14 on D854, 11 Mar 2000, FSG (1 ♀, AMG). **Swakopmund District**: Gobabeb, 13 Feb 1979, Wharton (1 ♂, PPRI); Gobabeb, Kuiseb River bed, 27 Jan 1978, O. Lomholdt (1 ♂, ZMUC); same data but 30 Jan 1978 (1 ♂; 2 ♀, 1 ♂, ZMUC); near Gobabeb at *Welwitschia* forest, 3 Oct 1967, E.S. Ross and A.R. Stephen (1 ♂); Homeb in Namib National Park, 23 Jan 1988, R. Miller and L. Stange (1 ♀, 4 ♂, FSCA); N Homeb at 23°38′S 15°13′E, 14 Mar 1983, CDE (3 ♀, PPRI); Kuiseb River near Gobabeb, 18 Feb–20 Mar 1983, National Collection Kuiseb Survey (8 ♀, 5 ♂, PPRI); Mirabeb, 16 Mar 1983, CDE (1 ♂, PPRI); Mirabeb 40 km ENE Gobabeb, 19 Feb 1978, O. Lomholdt (2 ♀; 4 ♀, 1 ♂, ZMUC); 10 km E Swakopmund, 23 Feb 1990, MS (2 ♂, MS); 63 km NE Swakopmund, WJP, 19 Feb 1996 (1 ♀, 1 ♂), 5 Mar 1996 (2 ♂), 5 Dec 1996 (2 ♀, 4 ♂), and 9 Dec 1996 (1 ♀, 3 ♂).

***Tachysphex usakos* Pulawski, sp. nov.**
Figures 400, 401.

Derivation of name.— *Usakos*, a locality in Namibia near which many specimens were collected; a noun in apposition to the generic name.

Recognition.— Like several other *Tachysphex*, *usakos* combines a convex labrum (protruding beyond the clypeal free margin) and an elongate galea (length about 0.7 of scape) with a ridged propodeal side (only anteriorly so in some specimens), oblong upper metapleural pit, the propodeal dorsum all setose, with setae diverging anterad from the midline, and the cephalic and thoracic setae all straight (appressed on postocellar area).

The female of *usakos* is similar to *aethiopicus*. See that species for recognition characters (p. 83).

The male has a broad clypeal lobe (distance between lobe corners 1.1–1.4 × distance between a corner and orbit), and an emarginate forefemur. Unlike *aethiopicus* and *ruber*, sterna have no setal fringes, but this character can be seen only when the gastral segments are fully extended. Also, the apicolateral corners of foretarsomeres I and II are not expanded (slightly expanded in *aethiopicus*, see Fig. 9d), the forefemoral notch is asetose, and gastral segments IV–VII are black (in *ruber*, the forefemoral notch is setose and the gaster all or partly red in most specimens).

Description.— Labrum convex, markedly protruding from beneath clypeus. Galea aciculate, sparsely punctate, as long as 0.7 of scape. Scutal punctures well defined, mostly about one diameter apart, but averaging up to about 2–3 diameters apart on disk in some females. Mesopleural punctures minute, superficial, mostly about one diameter apart (several diameters apart in some specimens). Propodeal dorsum uniformly microsculptured or with longitudinal ridges at very base; side ridged; upper metapleural pit oblong. Hindcoxal dorsum with inner margin carinate basally, carina not expanded.

Setae appressed on postocellar area and scutum; nearly erect, about one midocellar diameter long on each side of oral fossa next to occipital carina; diverging obliquely anterad from midline on propodeal dorsum, but pointing laterad on sides; practically appressed on midfemoral venter.

Head and thorax black, but mandible (except apically), clypeal bevel and lip, and labrum reddish or (some males) yellowish; pronotal lobe yellowish posteriorly in most males. Frontal setae silvery in both sexes. Wing membrane almost hyaline; forewing costal vein light brown, subcostal vein dark brown. Femora black except red apically, largely red in some males. Tibiae and tarsi red. Gaster segments I–III red (I and II in single male from Bismarck River), remainder black. Terga I–IV in female, I–III to I–V in male, silvery fasciate apically.

♀.— Clypeus (Fig. 400a): bevel slightly longer (most specimens) to slightly shorter than basomedian area; lip minimally arcuate, emarginate or not mesally, not sinuous laterally. Width of post-

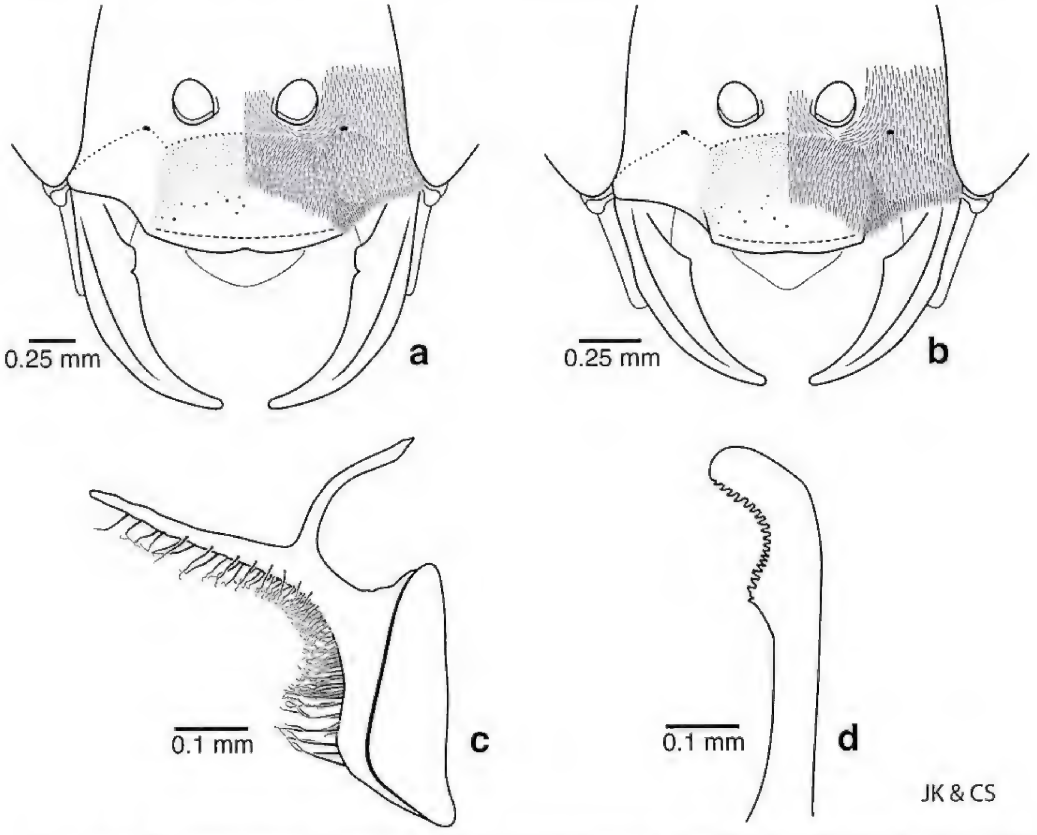


FIGURE 400. *Tachysphex usakos* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

ocellar area 1.2–1.3 × length. Dorsal length of flagellomere I 2.8–3.2 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines, microsetae sparser than on remaining surface. Forebasitarsus with 6–8 rake spines. Foretarsomeres I–III slightly expanded apicolaterally over bases of rake spines (as in Fig. 9c). Apical depression of tergum V with sparse, minute punctures and inconspicuous setae. Pygidial plate unsculptured, shiny, except for tiny punctures that average many diameters apart (less than that near margins). Length 8.0–9.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 400b): bevel shorter than basomedian area, nearly reduced in some specimens, varying from nearly unsculptured between punctures to conspicuously microsculptured; lip free margin slightly arcuate to straight, with well-defined corner; distance between corners about 1.1–1.4 × distance between corner and orbit. Width of postocellar area 1.2–1.4 × length. Dorsal length of flagellomere I 1.6–1.8 × apical width. Forefemoral notch microsculptured, asetose. Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Sterna without setal fringes. Sternum VIII shallowly emarginate apically. Length 6.1–8.2 mm. Volsella and penis valve: Figs. 400c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 401).— Namibia.

RECORDS— HOLOTYPE: ♂, **NAMIBIA: Karibib District**: 50 km SW Usakos, 21 Feb 1990, WJP (1 ♀, CAS). PARATYPES: **NAMIBIA: Karibib District**: 15 km W Karibib, 26 Feb 1990, WJP (1 ♀); 50 km SW

Usakos, 21 Feb 1990, MS (8 ♀, MS), WJP (2 ♀); 55 km SW Usakos, 25 Feb 1990, MS (1 ♂; 2 ♂, MS); same locality but 1 Mar 1990, MS (7 ♀, MS), WJP (1 ♀, 1 ♂); 65 km SW Usakos, 24 Feb 1990, MS (5 ♀; 14 ♀, 1 ♂, MS), WJP (11 ♀, 1 ♂); same locality but 1 Mar 1990, MS (1 ♂, MS), WJP (1 ♀, 1 ♂). **Windhoek District**: Bismarck River 30 km E Windhoek, 4 Feb 1990, WJP (1 ♂).

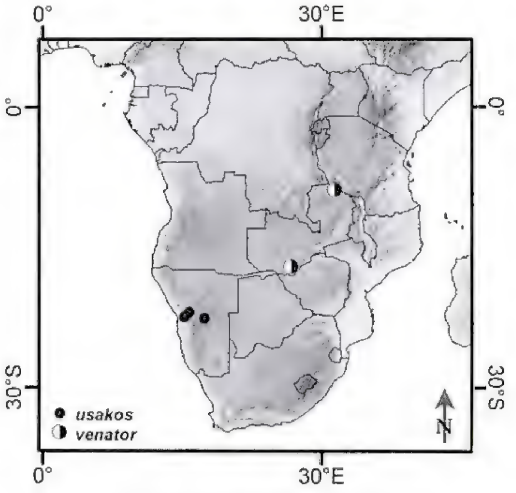


FIGURE 401. Collecting localities of *Tachysphex usakos* and *venator*.

Tachysphex vanrhynsi Arnold

Figures 402–404.

Tachysphex vanrhynsi Arnold, 1940:120, ♂. Holotype: ♂, South Africa: Western Cape Province: Vanrhynsdorp (TMP), examined.— Bohart and Menke, 1976:277 (listed); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

RECOGNITION.— *Tachysphex vanrhynsi* has a flat labrum, galea shorter than wide in lateral view, crossvein cu-a of the hindwing vertical, and tarsi unmodified (i.e., length of tarsomeres II more than twice apical width, length of tarsomeres IV more than apical width, and tarsomeres V without spines on venter or lateral margins). Unlike most species with this combination of characters, *vanrhynsi* has an all black gaster, without silvery tergal fasciae, the femora and tibia all black, setae erect or inclined posterad on the propodeal dorsum, the male foretarsus with a conspicuous rake, and male sterna II–VI each with an impunctate apical depression. *Tachysphex crassipes*, *mesembrius*, and *punctatiformis* are similar, but in contrast with these species the setae of *vanrhynsi* are straight rather than sinuous (at most slightly angled apically) on the postocellar area, lower gena, thorax, and midfemoral venter (scutal setae, near distal end of admedian line, about equal to midocellar diameter in female, up to about 1.5 midocellar diameter in male). Subsidiary recognition features of *vanrhynsi* are: mesopleuron dull, conspicuously microsculptured, impunctate or with punctures that range from small to evanescent; clypeal lip of female with median emargination and two lateral incisions on each side; and distance between clypeal lip corners, in the male, equal to 0.8–1.1 of distance between corner and adjacent orbit.

DESCRIPTION.— Scutal punctures well defined, averaging several diameters apart on disk in female and most males, about one diameter apart in some males; interspaces shiny, unsculptured or nearly so. Mesopleuron dull, conspicuously microsculptured, with punctures that range from small to evanescent (several to many diameters apart at center), impunctate in some specimens. Propodeal dorsum longitudinally ridged (ridges irregular in most specimens); side with well-defined ridges.

Setae straight or slightly angled apically; suberect on each side of oral fossa next to occipital carina; erect on postocellar area and mesopleuron; suberect, inclined posterad on scutum and propodeal dorsum; appressed on midfemoral venter (setal length about 0.3 × basal mandibular width on postocellar area and near to occipital carina; scutal setae, near distal end on admedian line, about equal to midocellar diameter in female, up to about 1.5 × midocellar diameter in male).

Body black including legs except mandible dark red at about two thirds of length and tarsal apex brown. Frontal setae silvery in female, varying from golden to silvery in male. Wing membrane infumate, subcostal vein of forewing dark brown, costal vein black. Terga without silvery, apical fasciae.

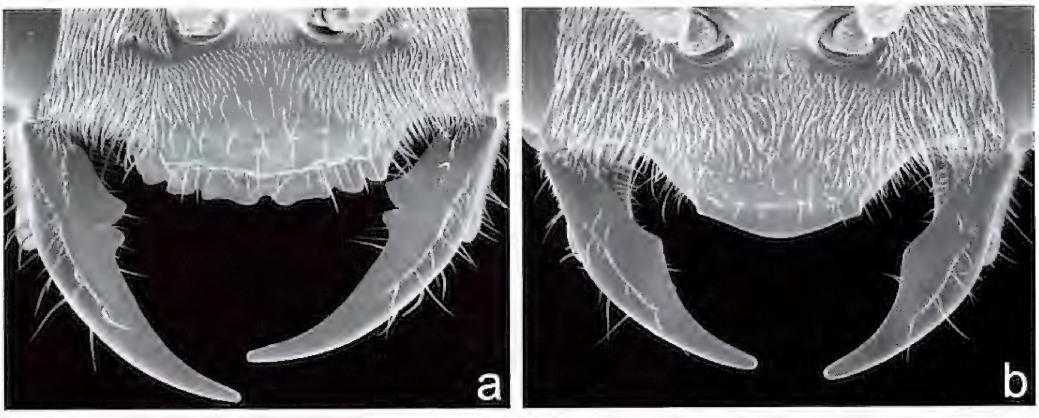


FIGURE 402. *Tachysphex vanrhynsi* Arnold: a – female clypeus and mandible; b – male clypeus and mandible.

♀.— Clypeus (Fig. 402a): bevel longer than basomedian area; lip free margin arcuate, emarginate mesally, with two lateral incisions on each side. Width of postocellar area about 1.0 × length. Dorsal length of flagellomere I 2.2–2.3 × apical width. Forecoxa with small apicomedian process. Forefemoral posteroventral face sparsely punctate in apical half (punctures up to several diameters apart). Dorsal foretibial surface with two or three spines; outer surface with narrow, unsculptured zone and one or two spines. Forebasitarsus with 6–8 rake spines. Apical depression of tergum V mesally unsculptured and glabrous. Pygidial plate: punctures averaging several diameters apart, interspaces practically unsculptured. Length 8.4–10.6 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 402b): bevel ill defined, about as long as basomedian area; lip free margin arcuate or sinuate, with well-defined but nonprominent corner; distance between corners about 0.8–1.1 × that between corner and orbit. Width of postocellar area 1.0–1.1 × length. Dorsal length of flagellomere I 1.7–2.0 × apical width. Forefemoral posteroventral surface sparsely punctate in apical half in a specimen from Kraaiwater (punctures many diameters apart). Forefemoral notch microscopically setose. Outer margin of forebasitarsus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Tergum VII, in some specimens, with punctures up to several diameters apart. Sterna III–VI with well-defined punctures that are visibly larger than those on sternum II basally; apical depressions of sterna II–VI contrastingly impunctate, glabrous. Length 7.5–9.0 mm. Volsella and penis valve: Fig. 403.

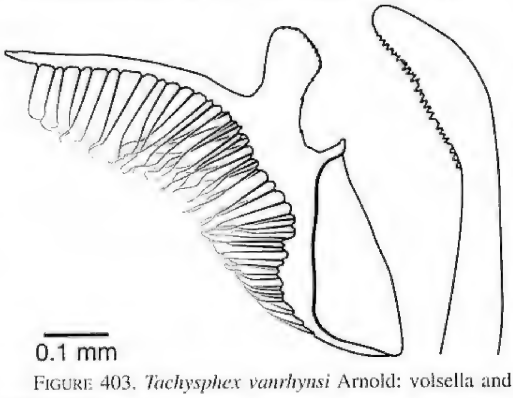


FIGURE 403. *Tachysphex vanrhynsi* Arnold: volsella and penis valve.

PREY.— Two females from Richtersveld National Park, South Africa, are each pinned with prey, a nymphal lithidiine acridid, *Eneremius* sp., about 10 mm long (det. F.W. Gess).

COLLECTING PERIOD.— August through October.

GEOGRAPHIC DISTRIBUTION (Fig. 404).— Western Cape and Northern Cape provinces of South Africa.

RECORDS— SOUTH AFRICA: Northern Cape Province: Bowesdorp about 6–7 km N Kamieskroon

at 30°09′S 17°56′E (2 ♀, SAM), Colesberg (1 ♀, SAM), Dassiefontein Farm 14 road km E Kamieskroon (2 ♀, 3 ♂; 1 ♀, PPRI), 5 km S Doringbos at 32°01′S 19°13′E (1 ♀), Doringrivier N Nieuwoudtville at 31°18′S 19°07′E (2 ♀, PPRI), Garies (4 ♀, 2 ♂, AEI), Goegap Nature Reserve (5 ♀, 15 ♂, AMG), Goegap: Kraaiwater at 29°38′S 18°00′E (1 ♂; 1 ♀, AMG), Goegap windmill (3 ♂, AMG), Groenkloof 7.5 km SE Leliefontein which is 30°19′S 18°05′E (3 ♀, AMG), Grootvlei Pass 16 km W Kamieskroon (1 ♂, AMG), Kamiesberg: Bakleikraal at 30°13′S 18°03′E (1 ♂, AMG), Kamieskroon (2 ♂, AMG), Klipfontein at 21°51′S 17°47′E (1 ♀, AMG), 5 km from Leliefontein on road to Groenkloof (1 ♂, AMG), Mesklip at 29°48′S 17°52′E (1 ♀; 1 ♀, AMG), Nababeep (2 ♀, AMG), Nariep (1 ♀, AMG), Nieuwoudtville: Flower Reserve East at 31°21′56″S 19°08′52″E (1 ♀; 1 ♀, 2 ♂, OHL), near Nieuwoudtville (1 ♂, OHL), Nieuwoudtville Botanical Gardens at 31°22′S 19°07′E (1 ♀, 3 ♂; 2 ♀, 4 ♂, PPRI), 6 km W Nieuwoudtville at 31°22′S 19°03′E (1 ♀, 1 ♂, AMG), Richtersveld National Park: Koeroegabvlakte at 28°11′S 17°03′E (3 ♀, 4 ♂, AMG) and 1.5 km from Helskloof Gate at 28°18′S 16°57′E (1 ♂, AMG), Sors Sors 9 km NE Kamieskroon (2 ♀, AMG), Springbok (1 ♂, AEI), Taaiboskraal to Anegas at 30°07′S 18°01′E (1 ♀, 1 ♂, AMG). **Western Cape Province**: Biedouw Valley at 32°08′S 19°14′E (2 ♂, PPRI), Blackheath at 33°58′S 18°41′E (2 ♀, SAM), Cape (1 ♀, BMNH, ex coll. F. Smith), Cape of Good Hope Nature Reserve: Olifantsbos at 34°16′S 18°23′E (1 ♂; 1 ♀, SAM), 60 km N Cape Town (1 ♀; 1 ♀, 3 ♂, OÖLM), Citrusdal (1 ♂, KU; 1 ♀, SAM), 20 km N Citrusdal (1 ♀, 1 ♂), 11 km W Clanwilliam (2 ♂, AMG), Clanwilliam Dam (eastern bank) at 32°18′S 18°57′E (2 ♀, 2 ♂; 5 ♀, 6 ♂, AMG), Clanwilliam Dam (eastern bank): Caleta Cove at 32°13′S 18°57′E (1 ♀, AMG), 5 km N Clanwilliam at 32°08.1′S 18°51.3′E (6 ♀, 3 ♂; 1 ♀, BMNH), 9 km N Clanwilliam at 32°03.8′S 18°48.2′E (1 ♀), Cold Bokkeveld in Ceres District (1 ♂, SAM), Die Bos road 30 mi E Clanwilliam (1 ♀, KU), Graafwater (1 ♀; 1 ♀, 1 ♂, SAM), Het Kruis (2 ♀, SAM), 9 km N Hopefield (1 ♂, AMNH), Kalkgat Farm 40 km NE Vanrhynsdorp at 31°07′04″S 18°55′18″E (1 ♀; 2 ♀, OHL), Knersvlakte: railroad station at 31°34′47″S 18°30′13″E (1 ♀, OHL), Kommetjie (2 ♀, 2 ♂, AMNH), S Lambert's Bay (2 ♀, 1 ♂, OÖLM), Pakhuis Pass (2 ♀, 12 ♂; 1 ♂, BMNH; 1 ♂, PPRI; 1 ♂, SAM), Rust en Vrede in Oudtshoorn District (1 ♂, SAM), Stellenbosch (2 ♀), Vanrhynsdorp (2 ♀, 3 ♂, TMP, including holotype of *vanrhynsi*), Vanrhyns Pass at 31°22′S 19°01′E (1 ♂, PPRI), 20 km E Velddrif (1 ♂, AMNH), Yzerfontein (2 ♀, UCD).

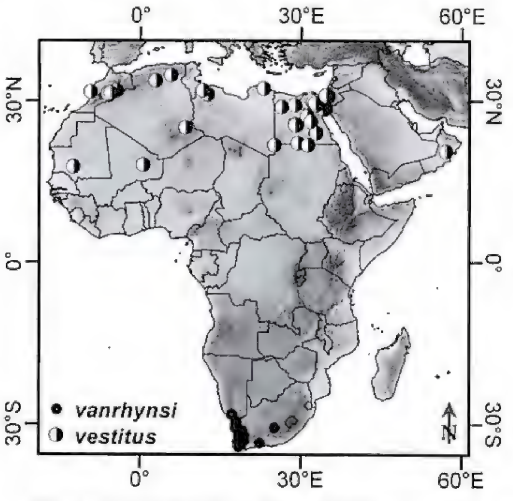


FIGURE 404. Collecting localities of *Tachysphex vanrhynsi* and *vestitus*.

Tachysphex venator Arnold

Figures 401, 405.

Tachysphex venator Arnold, 1960a:468, ♀. Holotype: ♀, Northern Rhodesia: Abercorn, now Zambia: Mbala (SAM), examined.— Bohart and Menke, 1976:277 (listed).

RECOGNITION.— The female of *venator*, known only from northern Zambia (the male is unknown), has tarsomeres IV wider than long, with the dorsoapical margin very broadly emarginate (almost straight), apicoventral margins of tarsomeres III and IV projecting or at least convex mesally, tarsomeres V angulate basoventrally, each with a central cluster of small spines on the venter and the apicoventral margin produced into a lobe, and on each leg one claw smaller than the other. It resembles the South African *argentifrons* in having sparsely setose fore- and midfemoral posteroventral surfaces (setigerous punctures many diameters apart). Unlike that species, the clypeal lip of *venator* has only one, shallow lateral emargination on each side (Fig. 405), the length of fla-

gellomere I is about 2.25 × apical width (about 0.85 × length of II), the midtrochanteral venter is impunctate, and sternum I has a longitudinal carina that bisects the apical depression. In *argentifrons*, the clypeal lip has two lateral incisions on each side (incisions may be lost in worn specimens), the length of flagellomere I is 1.4–1.6 × apical width (about 0.6 × length of II), the midtrochanteral venter is punctate, and the apical depression of sternum I is not bisected by a carina.

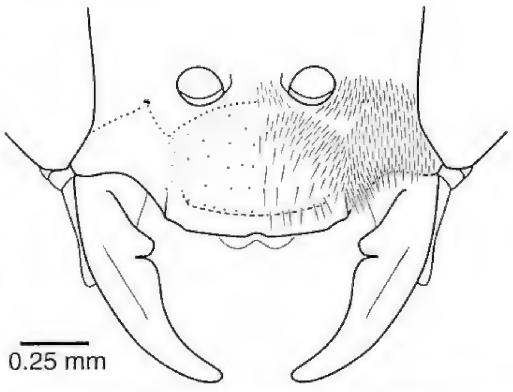


FIGURE 405. *Tachysphex venator* Arnold, female: clypeus and mandible.

DESCRIPTION (female only).— Clypeus with obtuse, short carina that emerges from each lip corner. Scutal punctures about 1–2 diameters apart (less than that along margins); interspaces shiny. Mesopleural punctures well defined, about 2–3 diameters at center; interspaces shiny. Propodeal dorsum irregularly ridged longitudinally; side ridged. Hindcoxal dorsum with inner margin carinate basally. Sternum I with longitudinal carina that bisects apical depression.

Setae nearly appressed on postocellar area, suberect on scutum and on each side of oral fossa next to occipital carina (setal length about one midocellar diameter); oriented uniformly posterad on propodeal dorsum.

Head and thorax black, mandible reddish mesally. Frontal setae silvery. Wing membrane slightly infumate; costal and subcostal veins of forewing brown. Femora black; tibiae black, but foretibial inner surface yellowish brown in holotype; tarsal apex brown. Gaster black. Terga I–IV silvery fasciate apically, but fascia broadly interrupted on tergum IV.

♀.— Labrum emarginate. Clypeus (Fig. 405): bevel markedly longer than basomedian area; lip free margin arcuate, shallowly emarginate laterally. Width of postocellar area 1.0 × length. Dorsal length of flagellomere I about 2.25 × apical width. Scutum and scutellum slightly flattened. Midtrochanteral venter impunctate, shiny. Forefemoral venter and midfemoral posteroventral surface with punctures that are many diameters apart, interspaces practically unsculptured. Dorsal foretibial surface with several minute, inconspicuous, suberect bristles; outer surface impunctate, glabrous, with several fine bristles. Forebasitarsus with eight rake spines, apical three with contiguous sockets. Tarsomeres III with apicoventral margin arcuate. Length of fore-, mid-, and hindtarsomeres IV about 0.75, 0.8, and 0.8 × apical width, respectively; dorsoapical emargination broadly obtuse (almost straight), apicoventral margin obtusely prominent; outer margin of foretarsomere IV about 0.5 length of inner margin. Tarsomeres V angulate basoventrally, with central cluster of small spines on venter; lateral margin with row of small spines subbasally; apicoventral margin produced into lobe (as in Figs. 34a, b); outer claw in each pair shorter and thinner than inner claw (opposite on foretarsus). Apical depression of tergum V impunctate, glabrous. Pygidial plate with punctures averaging several diameters apart; interspaces unsculptured. Length 7.5 mm.

♂.— Unknown.

COLLECTING PERIOD: 10 March, 7 July (holotype).

GEOGRAPHIC DISTRIBUTION (Fig. 401).— Known from two localities in Zambia.

RECORDS— ZAMBIA: **Northern Province**: Mbala (1 ♀, SAM, holotype of *venator*). **Southern Province**: 25 km E Kalomo (1 ♀).

***Tachysphex vestitus* Kohl**
Figures 404, 406–408.

Tachysphex vestitus Kohl, 1892:217, ♂. Holotype or one syntype: ♂, Algeria: Biskra (NHMW), **here designated as lectotype**, examined.— Dalla Torre, 1897:686 (in catalog of world Hymenoptera); Morice, 1911:104 (Algeria, description of ♀); nec Maidl, 1926:236 (= *Tachysphex micans*); de Beaumont, 1940:173 (in revision of Egyptian *Tachysphex*); Honoré, 1942:55 (in checklist of Egyptian Sphecidae); de Beaumont, 1947a:191 (in revision of Egyptian *Tachysphex*), 1950a:405 (Algeria), 1950b:20 (Egypt), 1955:182 (Morocco), 1956a:198 (Libya), 1958:61 (Algeria), 1960b:239 (Libya); Pulawski, 1964:95 (Egypt), 1971:382 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:12 (Israel); Bohart and Menke, 1976:277 (listed); Dollfuss, 1989:13 (type material in NHMW); Roche and Zalat, 1994:115 (Egypt: Sinai Peninsula).

Recognition.— *Tachysphex vestitus* is characterized by a convex frons (Figs. 406c-e), membraneous galea, all or partly red femora, mesopleural vestiture completely hiding the integument in fresh specimens; in addition, the gaster is all red in the vast majority of specimens.

In the female, the clypeal bevel is absent, the clypeus being closely punctate from frontoclypeal surface to lip base (Fig. 406a), and the pygidial plate is broadly rounded apically, unsculptured and shiny anteriorly but microscopically (mainly longitudinally) ridged in the posterior half or third (Figs. 407b, c).

The male is further characterized by a largely impunctate tergum VII (punctate near hindmargin only), impunctate and asetose sterna II–VI (except sterna II and III punctate laterally), and outer margin of forebasitarsus with five or six rake spines. Other species are similar, but in *vestitus* the free margin of the clypeal lobe is nearly straight, slightly arcuate, or has a small median projection (Fig. 406b). *Tachysphex deserticola* has a similar clypeus, but in *vestitus* the forefemoral notch is deeper (Fig. 406f), margined both anteriorly and posteriorly, covered with erect microsetae, and the tibiae are closely, uniformly micropunctate and setose. In *deserticola*, the forefemoral notch is shallower, not margined, glabrous, and each tibia has a sparsely punctate, sparsely setose, shiny zone (outer surface of the foretibia, dorsal surface of mid- and hindtibia).

Description.— Galea membranous. Frons markedly convex (Figs. 406c-e); supraantennal swellings punctate, concealed by vestiture. Gena narrow as seen from above (Figs. 406c, d). Propleuron all or largely unsculptured. Scutal punctures minute, uniform, almost contiguous. Mesopleuron uniformly microsculptured. Punctures of mesothoracic venter less than one diameter apart in female, several to many diameters apart in most males, about one diameter apart in some. Propodeal dorsum and side dull, uniformly microsculptured; posterior surface, in dorsal third or so, with wide median impression. Forewing longer in distal half than in other species (Fig. 408a) except *deserticola*. Hindcoxal dorsum with inner margin obtusely carinate basally, carina not expanded. Sternum I with ill-defined median carina.

Setae appressed or nearly so, in fresh specimens entirely concealing integument on frons, clypeus (except on lip anteriorly), mesopleuron, propodeal side, and hindfemoral outer surface (Fig. 407a); largely concealing integument of tergum I; suberect on each side of oral fossa next to occipital carina, about 0.4 × basal mandibular width. Setae of propodeal dorsum forming an ill-defined, varying pattern: median setae oriented mostly anterad, adlateral setae directed posterolaterad and joining apicomesally, and lateral setae pointing laterad. Propleuron and sternum I, in most specimens, all or largely asetose.

Head and thorax black, mandible yellowish red (except apically), clypeal lobe reddish near free margin; basal flagellomeres brown or reddish in some specimens, pronotal lobe yellowish brown. Frontal setae silvery in females and most males, golden dorsally in some males. Wings hyaline; forewing costal and subcostal veins light brown. Femora all red or fore- and midfemora (except api-

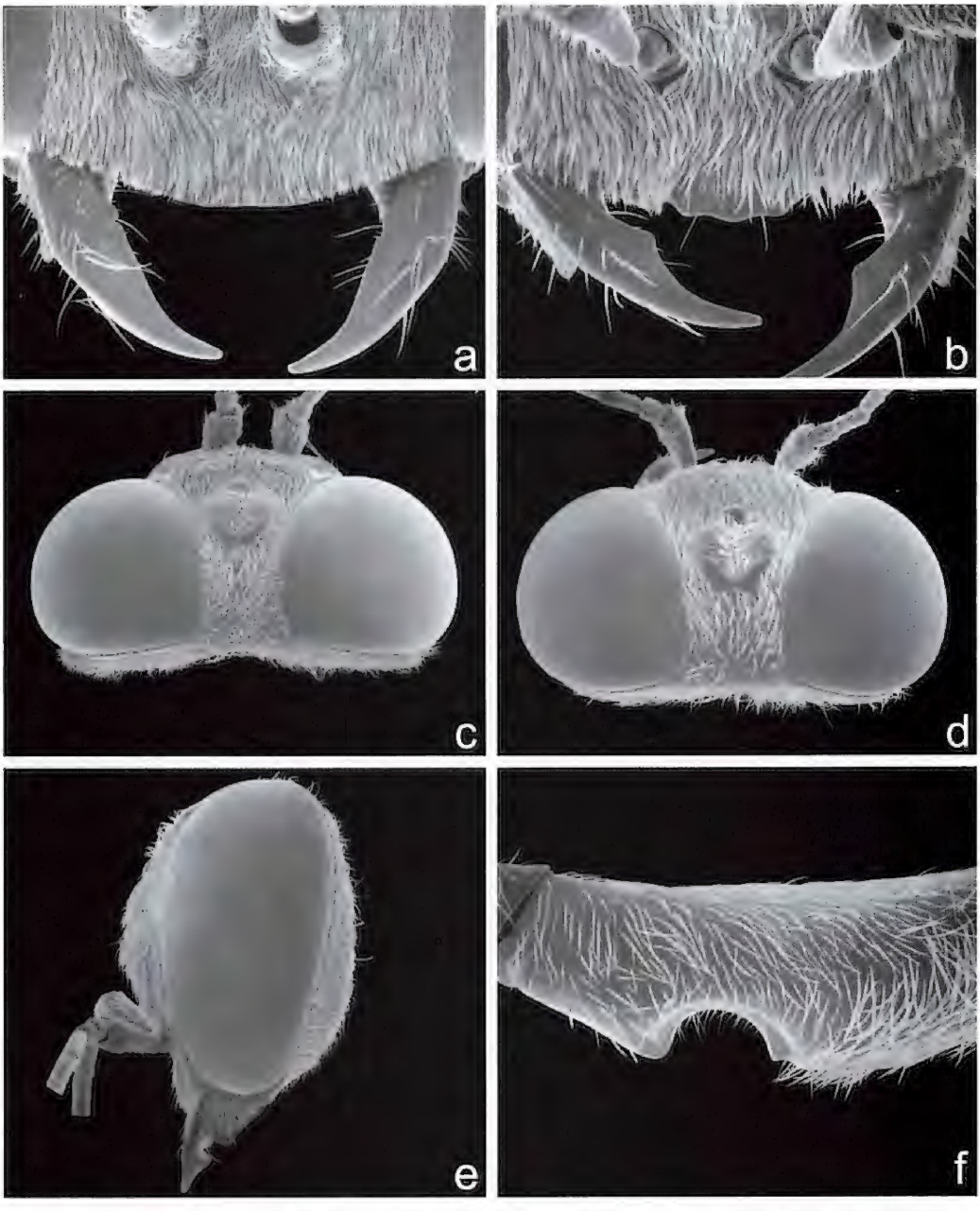


FIGURE 406. *Tachysphex vestitus* Kohl: a – female clypeus and mandible (×44); b – male clypeus and mandible (×72); c – female head in dorsal view (×24); d – male head in dorsal view (×34); e – male head in lateral view (×35); f – base of male forefemur showing notch (×59).

cally) and hindfemur basally black; tibiae and tarsi red. Gaster all red in the vast majority of specimens, but segments II–V largely darkened in a ♀ from Katamia, Egypt. Terga I–IV in female, I–V in male, silvery fasciate apically.

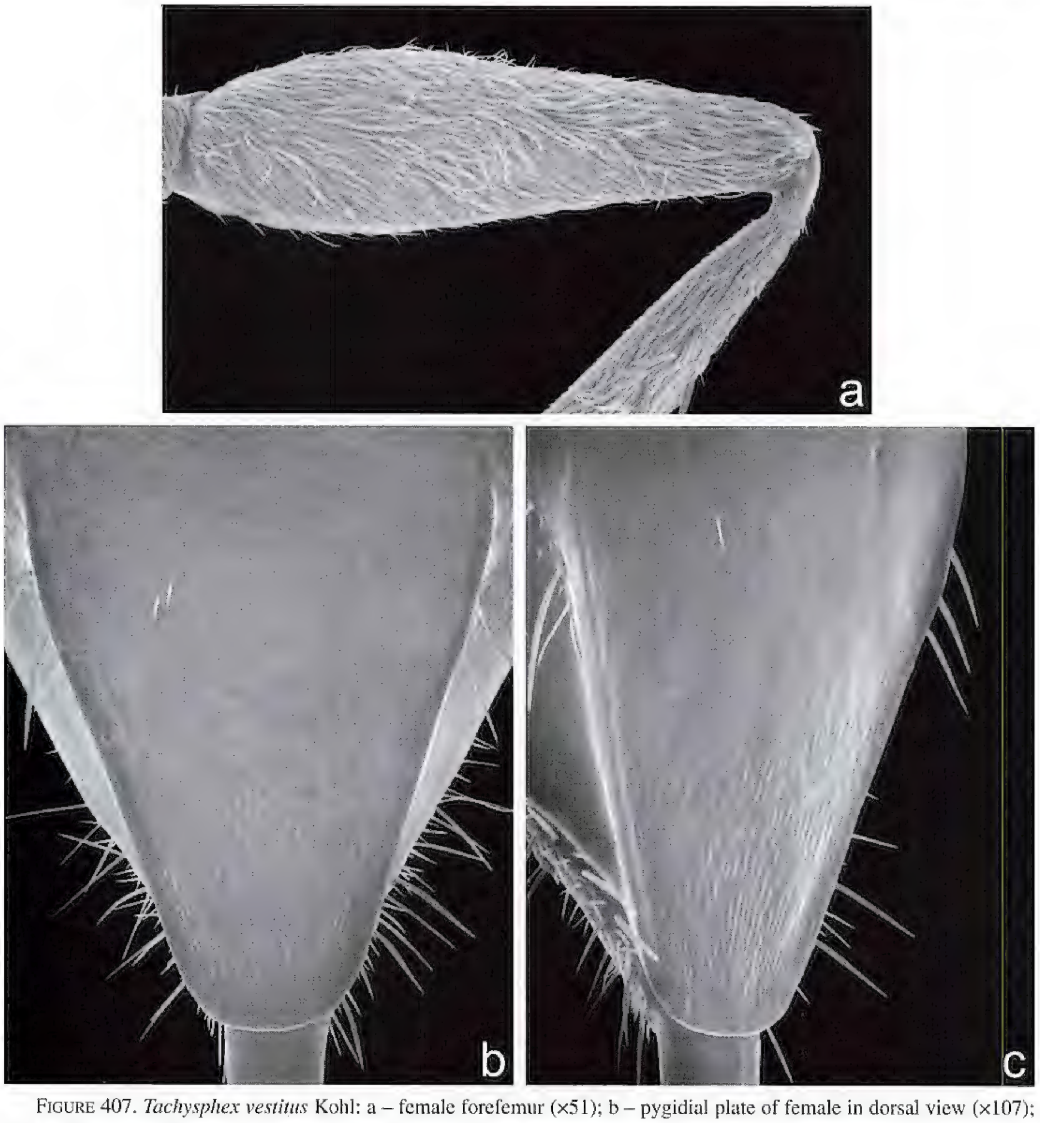


FIGURE 407. *Tachysphex vestitus* Kohl: a – female forefemur (×51); b – pygidial plate of female in dorsal view (×107); c – pygidial plate of female in lateral oblique view (×107).

♀.— Clypeus (Fig. 406a): middle clypeal section flat, closely punctate from frontoclypeal suture to lip base (bevel absent); lip free margin arcuate, not incised laterally. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 2.4–2.9 × apical width. Midtrochanteral venter impunctate, glabrous. Forefemoral punctures several diameters apart basoventrally. Dorsal foretibial surface with two spines; outer surface with one spine near midlength or with two spines. Forebasitarsus with 6–8 rake spines. Venter of apical tarsomeres, in most specimens, with median, subbasal spine. Apical depression of tergum V broad, unsculptured. Pygidial plate unsculptured and shiny anteriorly, microscopically (mainly longitudinally) ridged in posterior half or third (Figs. 407b, c). Length 7.5–10.0 mm.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 406b): middle clypeal

section flat, closely punctate from frontoclypeal suture to lip base (bevel absent); lip free margin almost straight or minimally pointed mesally, corner well defined but not prominent; distance between corners about 0.6 × distance between corner and orbit. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.9–2.7 × apical width. Trochanteral venters impunctate, glabrous. Forefemoral notch margined both anteriorly and posteriorly, with erect, sparse microsetae (Fig. 406f). Outer margin of forebasitarsus with five or six rake spines; outer apical spine of foretarsomere II markedly longer than tarsomere III. Tergum VII impunctate except along hindmargin. Sterna II–VI impunctate, asetose (except for usual erect setae bordering apical depressions and for appressed setae on sternum II laterally and sternum III anterolaterally). Length 5.5–8.0 mm. Volsella and penis valve: Figs. 408b, c.

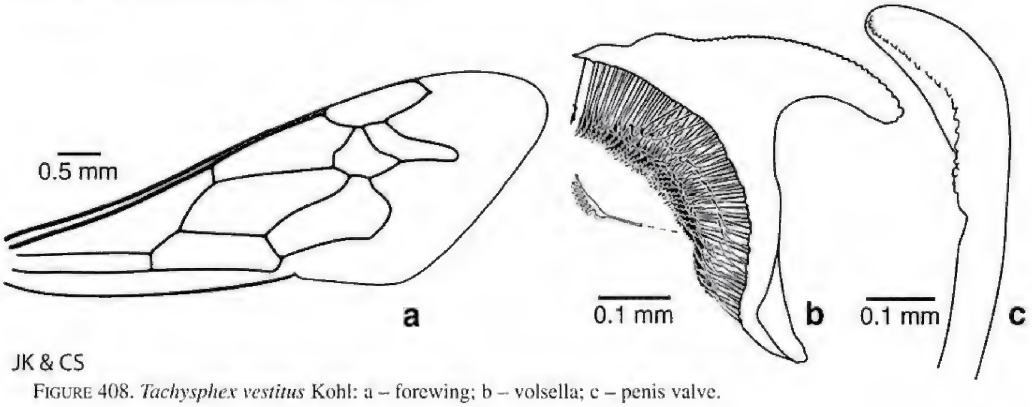


FIGURE 408. *Tachysphex vestitus* Kohl: a – forewing; b – volsella; c – penis valve.

WALKING BEHAVIOR.— Like *argenticeps*, and unlike the other *Tachysphex*, both females and males walk in straight or circular patterns, then take short flights, as I observed in Sinai Peninsula in May 1993 and in Oman in December 2003.

GEOGRAPHIC DISTRIBUTION (Fig. 404).— North Africa south to Mali and Sudan, Israel, and Arabian Peninsula.

RECORDS— ALGERIA: Biskra (1 ♀; 1 ♂, NHMW, lectotype of *vestitus*), Laghouat (de Beaumont, 1950a), Oued Ti'n Taradjeli in Tassili des Ajjer (de Beaumont, 1958). **EGYPT**: **Al Fayyum**: Karanis (4 ♀, 1 ♂), Kom Osheim (1 ♀, 7 ♂). **Al Jizah** (= Ghiza): Abu Rawash (4 ♂), Dahshur (4 ♀, 3 ♂), Ghiza (5 ♂), Kerdasa (de Beaumont, 1940), Saqqara (1 ♂), Wadi um Assaad near Abu Rawash (de Beaumont, 1940). **Al Minya**: Wadi Assiuti (de Beaumont, 1940). **Al Qahirah** (= Cairo): Al Qassasin (Pulawski, 1971), Katamia area 40 km E Maadi (3 ♂; 1 ♀, MSNT), Maadi (Pulawski, 1971), Suez road (de Beaumont, 1940). **Al-Wadi al-Jadid**: Bir Dibis near Sudan border (1 ♂), and Dakhla oasis: Balad (1 ♀, ZMAN), Ezeb el Kossr (1 ♀, ZMAN), and Mut (4 ♀, ZMAN). **As Suways** (= Suez): 13–22 km N Ain Sokhna (Pulawski, 1971), 18–25 km W Suez (Pulawski, 1971). **Aswan**: Aswan, west bank (1 ♀, 1 ♂). **Matruh**: NW Bahariya oasis at 29°14′10″N 28°53′56″E (2 ♀, 1 ♂, AMNH), El Arig in Siwa oasis (de Beaumont, 1950b). **Sawhaj**: 4 km W Abydos (6 ♂). **Sina** (= Sinai): Dahab (Roche and Zalat, 1994), 8 km SE El Thamad (7 ♀, 1 ♂), Nakhl (1 ♀, 1 ♂), 51 km ESE Nakhl (1 ♂; 1 ♂, MSNT), St. Catherine monastery (2 ♂), 65 air km E Suez (1 ♀, 13 ♂; 7 ♂, MSNT), Wadi Gharandal 30 km NW Abu Zenima (16 ♀, 10 ♂; 1 ♂, MSNT), Wadi Sudr 50 air km SE Suez (2 ♂). **ISRAEL** (de Beaumont, Bytinski-Salz, and Pulawski, 1973, or as indicated): 32 km SE Beersheba = 5 km E Yeroham (1 ♂, CSE), Mamshit, Mazad Aqrabbim 45 km SE Beersheba (1 ♂, CSE), Revivim 20 km SW Beersheba (Pulawski, 1971), Yeroham. **LIBYA**: **Cyrenaica**: Tmimi (de Beaumont, 1960b). **Tripolitania**: Bir el Hamra (de Beaumont, 1956a), Giosc (de Beaumont, 1960b). **MALI**: Anefis (1 ♀, KMG). **MAURITANIA**: 25 km SW Moudjéria (1 ♀). **MOROCCO** (de Beaumont, 1955, or as indicated): Agadir, Boumalne between Ksar es Souk and Ouarzazate (1 ♂), Ksar es Souk, Tinerhir. **OMAN**: 253 km S Nizwa at 20°43.3′N 57°04.4′E (2 ♀, 1 ♂). **SUDAN**: Wadi Ain el Brins in Gebel 'Uweinat at 21°50′N 25°05′E (1 ♂), Wadi Halfa (1 ♀).

***Tachysphex vulneratus* R. Turner**
Figures 409–411.

Tachysphex vulneratus R. Turner, 1917a:325, ♀, ♂. Lectotype: ♀, Zambia: Nyamadzi River near Nawalia [N Sinda] (BMNH), designated by Pulawski, 1975:312, examined in 1974.— Arnold, 1923:155 (in revision of southern African *Tachysphex*), 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:277 (listed); Krombein and Pulawski, 1994:88 (in revision of Sri Lankan *Tachysphex*); Pretorius, 2005:116 (use of geometric morphometrics to determine sexual dimorphism in wing venation).

Tachysphex karrooensis Arnold, 1923:158, ♀, ♂. Lectotype: ♀, South Africa: Eastern Cape Province: Willowmore (SAM), designated by Pulawski *in* Krombein and Pulawski, 1994:88, examined. Synonymized with *Tachysphex vulneratus* by Pulawski *in* Krombein and Pulawski, 1994:88.— Arnold, 1930:3 (in checklist of Afrotropical Sphecidae); Bohart and Menke, 1976:274 (listed); Gess, 1981:19 (South Africa, nesting in friable soils).

Tachysphex foucauldi de Beaumont, 1952c:190, ♂. Holotype: ♂, Algeria: Hoggar: Tinhamour (LAUSANNE), examined before 1971. Synonymized with *Tachysphex vulneratus* by Pulawski *in* Krombein and Pulawski, 1994:88.— de Beaumont, 1956a:197 (Chad, description of ♀); Pulawski, 1971:379 (in revision of Palearctic *Tachysphex*).— As *Tachysphex vulneratus foucauldi*: Pulawski, 1975:312 (new status); Bohart and Menke, 1976:277 (listed).

As *Tachytes fluctuata* (part): Magretti, 1884:587 (Eritrea), **present correction**.

Recognition.— The female of *vulneratus* has a distinctive pygidial plate that is somewhat constricted preapically, broad apically, sparsely punctate and shiny between punctures anteriorly, and in most specimens contrastingly microsculptured and dull posteriorly (Figs. 409c, 410a). In addition, the gaster is black (apex red in many specimens) whereas the tibiae and tarsi are contrastingly red, and in the vast majority of specimens the clypeal lip has two pairs of lateral incisions (Fig. 409a).

The male of *vulneratus* has a deeply emarginate inner mandibular margin (just distad of tooth), caused by the reduction of the trimmal carina (Fig. 409b). This feature is shared by two sub-Saharan (*erectus*, *mkomazi*) and the following extralimital species: *cubanus* Pulawski (Cuba, Jamaica), *denisi* de Beaumont (western Mediterranean), *discrepans* Turner (Australia), *dominicanus* Pulawski (Cuba, Hispaniola), *haematopus* (Sri Lanka), and *paiute* Pulawski (California, Baja California). In *vulneratus*, however, the foretarsal rake is well developed and sterna IV–VI are largely impunctate and glabrous. In the other species, the foretarsus has no rake (except *paiute*) and sterna are densely punctate and setose throughout.

Males of *vulneratus* in which the mandibles are closed can be recognized by the following combination: sterna IV–VI largely impunctate and glabrous, hindwing crossvein cu-a vertical or with anal end closer to wing base than cubital end, forefemoral notch of average size, outer margin of forebasitarsus with 4–7 rake spines, free margin of clypeal lobe evenly arcuate, thoracic setae all straight or curved but not sinuous, gaster all black or red apically, and legs largely red.

Description.— Scutum punctate, punctures well defined, on disk averaging from less than one to about two or three diameters apart, compressed against each other in many Tanzanian specimens (integument thus appearing areolate). Mesopleuron varying: mostly with well-defined punctures that average less than one diameter apart, but punctures compressed against each other in specimens from Ivory Coast, Ghana, Togo, Kenya, and Tanzania (integument thus appearing regularly areolate); integument dull, with shallow, ill-defined punctures in some specimens from other parts of Africa. Propodeal dorsum irregularly longitudinally ridged to rugose, side ridged (ridges absent in smallest specimens). Hindcoxa: inner margin carinate basally. Sternum I with median carina which is well defined apically (carina lacking in some males).

Setae varying on postocellar area and scutum: nearly appressed in most specimens, but erect on postocellar area and nearly so on scutum in individuals from Tanzania, Namibia, Zimbabwe, and

South Africa (about equal to midocellar diameter on postocellar area); erect on each side of oral fossa next to occipital carina, about 0.3 × basal mandibular width; not obscuring integument of mesopleuron; most setae of propodeal dorsum inclined anterad, but lateral setae inclined posterad and joining apicomesally.

Head and thorax black, but mandible yellowish red mesally and pronotal lobe in many specimens brown posteriorly. Frontal and clypeal vestiture silvery in female, golden in male. Wings hyaline; costal vein of forewing light brown, subcostal vein dark brown. Femora varying from red (except forefemur black basally) to black (except femoral apex red); tibiae and tarsi red. Gaster red apically in most specimens, but all black in specimens from Asia, Burkina Faso, Chad, and in some specimens from Namibia and South Africa. Terga I–IV fasciate apically in most specimens (also tergum V in many males), but only terga I–III fasciate in many southern African specimens.

♀.— Clypeus (Fig. 409a): bevel longer or shorter than basomedian area; lip sinuate or arcuate, mostly with two lateral incisions on each side, but evenly arcuate (not incised) in single female from Table Mountain, South Africa. Width of postocellar area 0.7–0.8 × length. Dorsal length of flagellomere I 2.4–2.7 × apical width; apical flagellomeres flattened laterally, their inner and outer surfaces differently sculptured. Forefemoral venter, in most specimens, with punctures that are 1–2 diameters apart (several diameters apart in females from Burkina Faso and Chad, many diameters apart in females from Ivory Coast). Foretibia densely, uniformly punctate and setose throughout or (females from Burkina Faso and Chad, some from South Africa) outer surface glabrous; dorsal surface with two or three spines; outer surface with two or three spines. Forebasitarsus with nine or ten

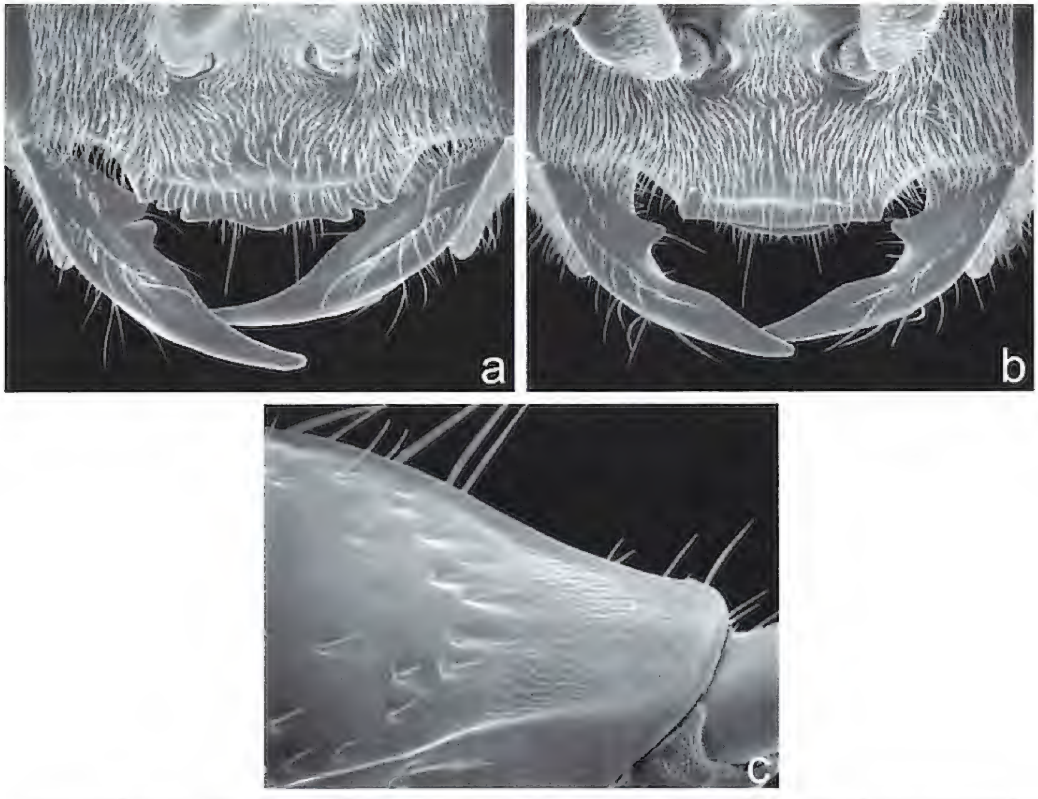


FIGURE 409. *Tachysphex vulneratus* R. Turner: a – female clypeus and mandible (×48); b – male clypeus and mandible (×48); c – pygidial plate of female in lateral oblique view (×240).

rake spines. Venter of apical tarsomeres with one preapical spine and a few basal spines. Tergum V sparsely (most specimens) to densely punctate except apical depression unsculptured. Pygidial plate broad, somewhat constricted preapically, with broadly rounded apex, mostly unsculptured except sparsely punctate, constricted portion evenly alutaceous, impunctate (Figs. 409c, 410a), but microsculpture evanescent in some specimens; inner surface without transverse carina. Length 8.5–10.5 mm.

♂.— Mandible: trimmal carina with large subbasal tooth, reduced distad of tooth, thus inner mandibular margin with conspicuous, round emargination (Fig. 409b). Clypeus (Fig. 409b): bevel shorter than basomedian area in most specimens, as long as basomedian area in some; lip free margin arcuate, with well-defined corner; distance between corners 1.2–1.3 × distance between corner and orbit. Width of postocellar area 0.5–0.7 × length. Dorsal length of flagellomere I variable: 2.0 × apical width in Thai, 1.2–1.7 × in Indian, 1.7–1.9 × in West African and Kenyan, and 1.5–1.9 in South African specimens. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with 4–7 rake spines (some may be shorter than basitarsus width); outer apical spine of foretarsomere II longer than foretarsomere III. Apical tarsomeres without ventral or lateral spines or (some specimens) with one preapical spine on venter. Punctures of tergum VII several diameters apart basomedially. Sterna IV–VI largely impunctate and asetose (also apical depressions of sterna II and III impunctate and asetose). Length 6.1–10.8 mm. Volsella and penis valve: Figs. 410b, c (all volsellar setae spatulate in some individuals).

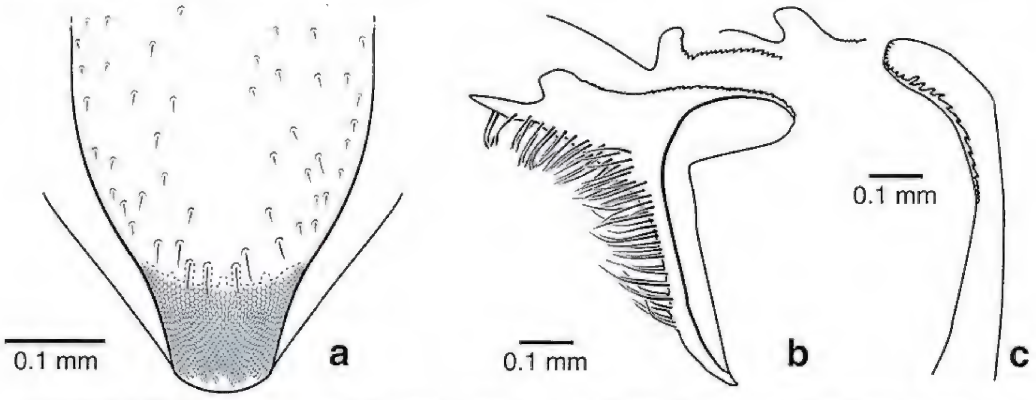


FIGURE 410. *Tachysphex vulneratus* R. Turner: a – pygidial plate of female; b – volsella with outlines showing individual variation of dorsal process; c – penis valve.

FLORAL RECORDS.— The male collected 16 km S of Rosh Pinah, Namibia, was visiting flowers of *Indigofera longispina* Baker (Papilionaceae), as recorded by F.W. and S.K. Gess, the collectors.

GEOGRAPHIC DISTRIBUTION (Fig. 411).— Africa from Cape of Good Hope to Tropic of Cancer, India to Thailand.

RECORDS.— **ALGERIA**: **Hoggar**: Tinhamour (1 ♂, LAUSANNE, holotype of *foucauldi*). **BOTSWANA**: Palapye (2 ♀, 2 ♂, SAM), Serowe (1 ♂). **BURKINA FASO**: Pala (1 ♀) and Soumousso (1 ♂) near Bobo Dioulasso. **CHAD**: Tibesti: Tao (1 ♀, BMNH). **ERITREA**: Khor Cheru (2 ♀, GENOVA) and Khor Gergabb (1 ♀, GENOVA), all three determined *Tachytes fluctuata* by P. Magretti. **GHANA**: Kawampe 45 km N Kintampo at 8°30′N 1°35′W (1 ♀, 19 ♂), 30 km S Kintampo (3 ♂), 55 km N Tamale (1 ♂), Techiman (18 ♂). **INDIA**: **Karnataka**: Bangalore (1 ♂), 10 km N Yelburga (1 ♀), near Yelburga (1 ♂, ZMUC). **Maharashtra**: Krishnaghiri Upawan National Park 9–12 air km NNW Bombay International Airport (6 ♂). **Rajasthan**: Mount Abu (1 ♂). **IVORY COAST**: Bouaké: Foro-foro (4 ♀, UCD), 50 km N Bouaké (1 ♂), 35 km NW Boundiali (8 ♂, MSNT), 20 km W Boundiali (13 ♂), Ferkessedougou (1 ♂), Katiola (1 ♀, MSNT),

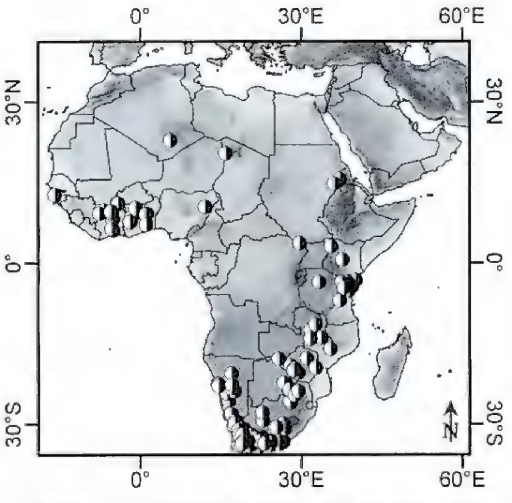


FIGURE 411. Collecting localities of *Tachysphex vulneratus* (African localities only).

56 km N Niakaramandougou (4 ♂), 30 km S Odienné (3 ♂), Sinématiali 23 km W Ferkessedougou (6 ♂), 40 km S Toumodi (1 ♂), 50 km S Yamoussoukro (1 ♂). **KENYA**: **Coast Province**: Malindi (1 ♂, MSNT), Muhaka at 4°20′S 39°30′E (1 ♀), Voi area (1 ♀, 9 ♂, OÖLM). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post (1 ♀). **Rift Valley Province**: Lodwar (1 ♀, 2 ♂). **MALAWI**: Lingadzi (1 ♀, BMNH), Mlanje (1 ♀, BMNH). **NAMIBIA**: **Bethanie District**: Barby Farm 25 mi W Helmeringhausen (2 ♂, BMNH). **Karasburg District**: Farm Altdorn 3 30 km NE Ai Ais at 27°48′16″S 17°40′02″E (1 ♂, CSE). **Lüderitz District**: E Oranjemund 34 km from checkpoint on road to Sendelingsdrif at 28°24′S 16°44′E (1 ♀, 2 ♂, AMG), 16 km S Rosh Pinah (1 ♂, AMG). **Maltahöhe District**: Naukluft at 24.3°S 16.2°E [= 24°18′S 16°12′E] (1 ♂, CSE). **Okahandja District**: Waldau River 17 km W Okahandja (2 ♀, 10 ♂). **Otjiwarongo District**: Okosongomingo Farm No. 149 50 km ESE Otjiwarongo (2 ♀, 1 ♂, LACM). **Rehoboth District**: 15 km N Kalkrand (2 ♀, 2 ♂; 2 ♂, MS), 9 km S Rehoboth (2 ♂). **Swakopmund District**: Swakopmund (1 ♂, BMNH; 2 ♂, JG; 1 ♂, MS), 10 km E Swakopmund (1 ♂), 15 km E Swakopmund (1 ♂, JG), 10 km N Swakopmund (1 ♀, 1 ♂; 1 ♂, AMG; 1 ♀, 2 ♂, NMN), Swakop River mouth (1 ♀, 1 ♂). **Walvis Bay District**: 11 km E Walvis Bay (1 ♂). **Windhoek District**: Aris 25 km S Windhoek (3 ♀, 2 ♂; 1 ♀, MS), 2 km S Aris (3 ♂). **NIGERIA**: Azare in SE Kano (1 ♂, BMNH). **SENEGAL**: Toubacouta (1 ♂, FB; 6 ♂, MSNT). **SOUTH AFRICA**: **Eastern Cape Province**: 17 mi S Adelaide (1 ♂, AMG), Belmont Valley 10 km E Grahamstown at 33°19′S 26°38′E (1 ♀, AMG), Elandsheuwels Farm 40 km W Steytlerville (2 ♂, USU), Goodehoop Farm 16 km W Steytlerville (1 ♂, USU), Graaf-Reinet (2 ♂, AMG; 1 ♂, BMNH), Grahamstown: Boskey Dell (1 ♂, AMG), 17 mi NW Grahamstown (3 ♂, AMNH), 18 km WNW Grahamstown: Hilton Farm (4 ♀, 16 ♂, AMG), Middelburg Division (5 ♂, SAM), Mountain Zebra National Park at 32°15′S 25°27′E (1 ♂), Oudebosch (1 ♀, SAM), Resolution 17 air km NNE Grahamstown (1 ♂, TMP), Rietbron (1 ♂, AMG), Somerset East (2 ♀, BMNH), Steynsburg (2 ♂, SAM), Steytlerville (1 ♀), 2 km N Steytlerville (2 ♂, USU), 6 km N Steytlerville (1 ♂, CSE; 4 ♀, 8 ♂, USU), 30 km S Steytlerville: Wolwekraal Farm (1 ♂; 10 ♂, USU), Sundays River (1 ♀, TMP), Waaipoort Pass 19 km ENE Steytlerville at 33°14.8′S 24°19.8′E (2 ♂), Willowmore (1 ♀, 1 ♂, SAM, lectotype and paralectotype of *karrooensis*; 4 ♀, 26 ♂, TMP), 9 km E Willowmore (1 ♀, 4 ♂), 43 km NE Willowmore at 33°08.3′S 23°50.4′E (2 ♂; 1 ♀, CSE), 37 km NW Willowmore in Grootrivierberg Range at 33°11.5′S 24°09.5′E (2 ♀, 14 ♂, USU), 6 km S Willowmore at 33°20′S 23°27′E (2 ♀, 1 ♂), 12 km W Willowmore at 33°16′S 23°22′E (3 ♀, 3 ♂). **Free State**: Goedemoed (1 ♂, SAM). **Gauteng**: Bryanston (2 ♂, AMG), Schoemansville (1 ♀, AMG). **Northern Cape Province**: Anenous in Namaqualand at 29°15′S 17°35′E (1 ♂, AMG), Arkoep Farm 6 km N Kamieskroon at 30°19′S 17°56′E (1 ♂, PPRI), Beukesfontein at 32°53′S 19°44′E (1 ♀, 1 ♂, PPRI), Calvinia (1 ♀, 1 ♂, BMNH), W Calvinia (1 ♀, 2 ♂, OÖLM), Colesberg (1 ♂, SAM), Goegap Nature Reserve 10 mi E Springbok (1 ♀, 4 ♂, AMG; 3 ♂, BMNH), Groen River 40 km SW Garies (8 ♂, OÖLM), 25 km E Hondeklipbaai (12 ♂, OÖLM), E Kamieskroon (5 ♂, OÖLM), SW Loeriesfontein (1 ♀, 5 ♂, OÖLM), 50 km W Loeriesfontein (2 ♂, OÖLM), Middelpos (1 ♂, FSCA), Moedverloor River (1 ♂, UCD), Nababeep in Namaqualand (2 ♂, AMG), Niekerkshoop (5 ♂, SAM), Nieuwoudtville (2 ♂, AMG), 51 km E Nieuwoudtville at 31°30′S 19°35′E (1 ♀, AMG), Olifantshoek (1 ♀, FSCA), Richtersveld National Park at 28°18.9′S 16°58.3′E (1 ♂), Richtersveld National Park: Koeroegabvlakte at 28°11′S 17°03′E (5 ♂, AMG) and 28°10′S 17°02′E (1 ♀, 1 ♂, AMG), near Richtersveld National Park between Annis and Dabie rivers at 28°20′S 16°55′E (1 ♂, AMG), 35 km W Springbok at 29°37′S 17°31′E (1 ♂, OHL), SW Springbok at Buffel River (10 ♂, OÖLM), Tanqua-Karoo National Park (2 ♀, 3 ♂, SAM), Theekloof in Fraserburg District (1 ♂, SAM),

VanWyksfontein 8 km W Norvalspont (2 ♀, 7 ♂, AMG), Wildeperdehoek Pass at 29°56′S 17°38′E (1 ♂, AMG). **Northern Province**: Afguns (1 ♀, 2 ♂, AMG), Ellisras (2 ♂), 10 km SW Naboomspruit (1 ♀, FSCA), Pietersburg (1 ♀, CU). **Western Cape Province**: Ashton (1 ♂, OÖLM), Beaufort West District (2 ♂, SAM), Beaufort West: Nieuwveldt (3 ♂, SAM), Beaufort West: Oukloof (3 ♀, 3 ♂, SAM), 20 km SE Beaufort West (2 ♂, BMNH, FSCA), Biedouw Valley at 32°08′S 19°14′E (2 ♂, AMNH), Cape of Good Hope Nature Reserve near Olifantbosbaai (9 ♂; 1 ♀, USNM), Cape Town including Milnerton (1 ♂; 2 ♀, 2 ♂, BMNH; 4 ♂, USNM), Cape Town: Table Mountain at 33°57′S 18°24′E (1 ♀, 7 ♂), 50 km N Cape Town (1 ♀, OÖLM), 60 km N Cape Town (1 ♂, OÖLM), Cederberg 15–30 km SE Ceres (3 ♂, BMNH; 1 ♀, 3 ♂, SAM), Citrusdal-Clanwilliam (1 ♂, AMG; 1 ♀, 1 ♂, SAM), Citrusdal District (1 ♂, SAM), 20 km N Citrusdal (1 ♀, 5 ♂, OÖLM), Clanwilliam (3 ♂, USU), Clanwilliam-Klawer (4 ♂, SAM), 11 mi W Clanwilliam (1 ♂, AMG), Dasklippas in Cederberg Mts. NE Porterville (1 ♀, 2 ♂, OHL), Doorn River Falls 5 km N Nieuwoudtville (1 ♂, BMNH), Doringbos at 31°58′19″S 19°13′33″ (1 ♂, CSE; 1 ♀, 2 ♂, OÖLM), Graafwater (1 ♂, FSCA), Greyton (2 ♀, 1 ♂, OÖLM), Huguenot (1 ♀, BMNH), Karoo National Park at 32°20′S 22°30′E (1 ♀, 2 ♂, PPRI), Knersflakte: Kalkgat (1 ♀, 1 ♂, OHL), Kobee 10 km NE Vanrhynsdorp (1 ♀, 5 ♂, OÖLM), Konstabel Farm 30 km WSW Matjiesfontein (1 ♂), Koup at 33°07′S 21°17′E (1 ♂), Ladysmith at 33°30′S 21°17′E (1 ♂, AMNH), 13 km ENE Laingsburg at 33°11′S 20°59′E (1 ♂), Lambert's Bay (9 ♂, OÖLM), 5 km S Lambert's Bay (1 ♀, 2 ♂, OÖLM), Langberg (3 ♀, 16 ♂, OÖLM), Letjesbosch (1 ♂, SAM), Little Karoo SE Groot River (4 ♂, OÖLM), Matjiesfontein (5 ♂; 9 ♀, 6 ♂, BMNH; 5 ♂, NHMZ), Merweville at 32°40′S 21°30′E (1 ♂, PPRI; 1 ♀, SAM), Merweville District (7 ♂, SAM), Montagu to Ladysmith (2 ♂, UCD), 27 km NE Montagu at 33°40′S 20°16′E (1 ♀, AMG), Mossel Bay (1 ♀, BMNH), Nuwerus (1 ♀, 3 ♂, OÖLM), Oloff Berghfontein at 32°01′S 18°31′E (1 ♀), Oudtshoorn (1 ♂), Oudtshoorn-Zebra (2 ♂, SAM), Prince Albert Road at Vlakkraal Rivier at 33°00′S 21°41′E (1 ♂), 5 km W Robertson (1 ♂), Stellenbosch (1 ♂; 1 ♀, SAM), Swartberg Pass at 33°19′S 22°03′E (1 ♀, PPRI), Swellendam (1 ♀, FSCA), Tierberg Farm (1 ♀, 5 ♂; 1 ♀, 7 ♂, AMG; 1 ♀, 4 ♂, OHL), 18 km NE Touwsriver (1 ♂, SAM), Traveler's Rest 21.5 km ENE Clanwilliam at 32°04′45″S 19°05′00″E (1 ♂, CSE), Tulbagh (4 ♂, AMG), Uniondale (3 ♂, PPRI), Wellington: Rooshoek (5 ♀, 13 ♂). **Location unknown**: Klipfontein in former Cape Province, one of many localities of this name (2 ♀, AMG). **TANZANIA**: **Kilimanjaro Region**: 61 km NNE Same (1 ♂). **Morogoro Region**: 62 road km SW Morogoro (3 ♂). **Shinyanga Region**: Old Shinyanga (1 ♀, BMNH). **Tanga Region**: 73 km NW Korogwe (2 ♂), 84 km NW Korogwe (1 ♂), 10 km WNW Mabokweni (6 ♀, 16 ♂; 5 ♂, UDS), Pangani River Camp 86 km NW Korogwe (3 ♂). **THAILAND**: **Kanchanaburi**: Kanchanaburi (1 ♂), Lam Ta Pen River bank 5 km NW Lat Ya (4 ♂). **Loei**: Loei (1 ♂). **TOGO**: Amaoudé 17 km N Sokodé (3 ♂), 14 km S Atakpamé (3 ♂), Sokodé (1 ♂, FSAG), 12 km S Sokodé (3 ♂), 5 km W Sokodé (10 ♂, 3 ♂), 10 km N Wahala = 30 km S Atakpamé (1 ♀). **ZAIRE**: **Haut-Zaïre**: Faradje at 3°40′N 29°40′E (1 ♀, AMNH). **ZAMBIA**: **Eastern Province**: mid and upper Luangwa Valley (R. Turner, 1917a), Nyamadzi River near Nawalia [N Sinda] (1 ♀, BMNH, holotype of *vulneratus*). **ZIMBABWE**: Bembesi River (1 ♂, CU), Bulawayo (3 ♀, AMG; 1 ♀, AMNH; 1 ♀, ANSP; 1 ♂, PPRI; 3 ♀, 4 ♂, SAM; 4 ♀, 1 ♂, TMP; 1 ♀, ZMAN), Bulawayo: Forestvale (1 ♂, AMG; 1 ♂, SAM), Bulawayo: Hillside (2 ♀, SAM; 1 ♀, TMP), Filabusi: Druid Mine (1 ♂, AMNH; 1 ♂, TMP), Harare (1 ♂, TMP), Kami Ruins (2 ♀, 2 ♂; 1 ♂, ANSP; 1 ♀, 5 ♂, NHMZ; 1 ♀, 2 ♂, SAM; 1 ♂, TMP), Penkridge (1 ♂, ZMAN), Turk Mine (1 ♀, SAM), Umguza River valley (1 ♀, SAM; 1 ♂, TMP), Victoria Falls (2 ♂; 2 ♂, SAM).

Tachysphex waltoni Arnold

Figures 412–414.

Tachysphex waltoni Arnold, 1940:121, ♀ (as *Waltoni*, incorrect original capitalization). Holotype: ♀, South Africa: Eastern Cape Province: Resolution 17 km NNE Grahamstown (TMP), examined.— Bohart and Menke, 1976:277 (listed).

RECOGNITION.— *Tachysphex waltoni* has a black gaster and red tibiae (the female mid- and hindfemora are also red, all or largely so), the galea longer than wide in profile, the labrum slightly convex anteriorly and slightly protruding from beneath the clypeus (practically flat in small males), and unspecialized hindwing and tarsi (i.e., the two ends of crossvein cu-a are nearly equi-

distant from wing base, length of midtarsomere II 1.9 × width, and apical tarsomeres without ventral or lateral spines).

The female has the clypeal lobe with a free margin prominently arcuate to obtusely pointed (Fig. 412a), and the inner mandibular margin with a low tooth and a widely open cleft (Fig. 412a), a unique such combination (the mandibular cleft is also widely open in *mesembrius*, *modestus*, and particularly *plicosus*). Additional recognition features include: most setae of the propodeal dorsum inclined posterad (but inclined anterad mesally and basally) and forebasitarsus with 10–12 rake spines.

The male has an obtusely pointed clypeal lip whose free margin forms a single curved line with the rest of the clypeal margin (Fig. 412b), the lip corners being absent or rudimentary. The clypeus is similar in *braunsi* and *rufopictus*, but in *waltoni* the midfemur is uniformly micropunctate (or nearly so); setae of the propodeal dorsum are erect or inclined anterad basally and along midline (remaining setae inclined posterad); and setae of sterna III–VI are not fully appressed, markedly longer than those on sternum II basally. In the other two species, the midfemur is impunctate or at most sparsely punctate posteroventrally, setae of the propodeal dorsum are all inclined posterad, and sternal setae are fully appressed, nearly equal in length. Unlike *psilonotus* and *ziziphi*, which also have a similar clypeus, the male of *waltoni* has the propodeal dorsum entirely setose (rather than glabrous apicomesally) and no foretarsal rake.

Description.— Labrum slightly convex anteriorly, slightly protruding beyond clypeal free margin (practically flat in small males). Galea densely punctate, about as long as 0.8 of scape in female, as 0.9 in male. Scutal punctures averaging about 1–2 diameters apart in some specimens, up to 3–4 diameters in others; interspaces unsculptured or aciculate. Mesopleural punctures large to minute, averaging 2–3 diameters apart beneath scrobe; interspaces unsculptured to conspicuously microsculptured. Propodeal dorsum evenly microsculptured; side in most specimens aciculate, with punctures that are about 2–3 diameters apart (except impunctate along metapleural margin), minutely ridged in one female from Hilton Farm, South Africa. Hindcoxal dorsum with inner margin carinate basally.

Setae erect or nearly so on postocellar area, shorter than midocellar diameter; about as long as midocellar diameter on each side of oral fossa next to occipital carina; suberect, inclined posterad on propodeal dorsum except oriented anterad near propodeal foremargin and along midline (erect in some males); appressed on midfemoral venter.

Head and thorax black, mandible reddish except basally and apically. Frontal setae silvery in both sexes. Wing membrane nearly hyaline to slightly infumate; forewing costal vein reddish, sub-

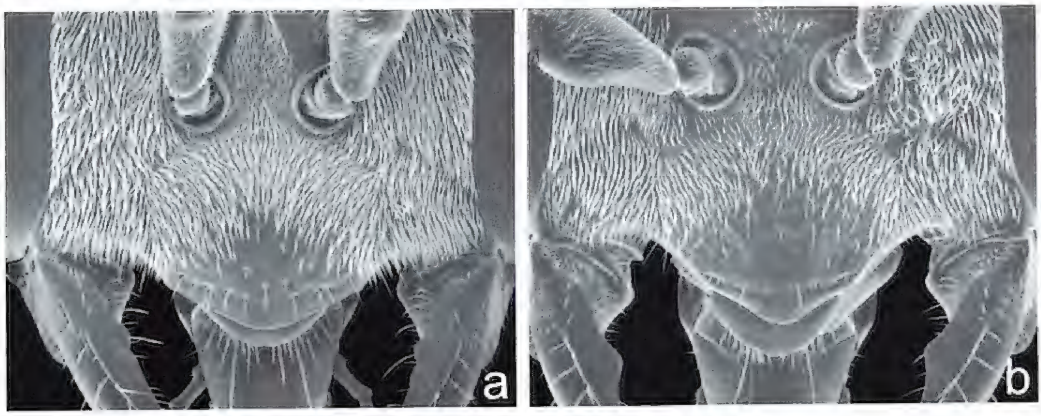


FIGURE 412. *Tachysphex waltoni* Arnold: a – female clypeus; b – male clypeus.

costal vein brown. Female forefemur all black or red apically, mid- and hindfemora red or midfemur black basally; male femora varying from all black (except apically) to all red. Tibiae and tarsi red. Gaster black. Terga I–III or I–IV silvery fasciate apically.

♀.— Mandible: trimmal carina with greatly reduced tooth and broadly open cleft (Fig. 412a). Clypeus (Fig. 412a): middle section markedly convex, bevel with large punctures, longer than basomedian area; lip free margin prominently arcuate to obtusely angulate, not incised laterally. Width of postocellar area 0.9–1.0 × length. Dorsal length of flagellomere I 1.8–2.0 × apical width. Dorsal foretibial surface with two or three spines; outer surface with one or two spines. Forebasitarsus with 10–12 rake spines. Hindtarsomere IV: length equal to apical width. Hindtarsomere V: apicoventral margin straight or minimally prominent mesally. Apical depression of tergum V impunctate, asetose. Pygidial plate with punctures averaging many diameters apart; interspaces unsculptured or nearly so. Length 9.1–10.8 mm.

♂.— Mandible: trimmal carina obtusely broadened mesally, without cleft (Fig. 412b). Clypeus (Fig. 412b): middle section markedly convex, bevel with large punctures, about as long as basomedian area, not clearly delimited dorsally; lip free margin obtusely angulate (concave on each side of midpoint in some specimens), without corner or at most with a rudimentary corner (forming single curved line with rest of clypeal margin). Width of postocellar area 1.0–1.3 × length. Dorsal length of flagellomere I 1.4 × apical width. Forefemoral notch asetose. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Setae of sterna III–VI not entirely appressed, longer than those on sternum II basally. Length 6.9–10.0 mm. Volsella and penis valve: Fig. 413.

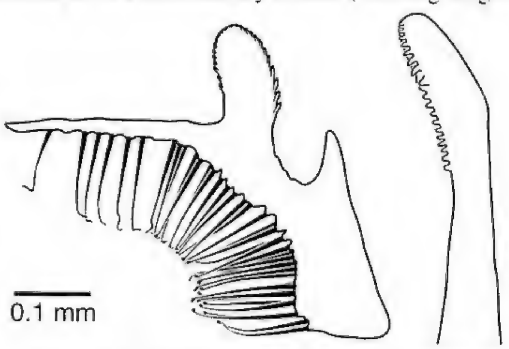


FIGURE 413. *Tachysphex waltoni* Arnold: volsella and penis valve.

FLORAL RECORDS.— Two specimens from Clifton Farm, South Africa, were collected "on minute flowers of *Bergia glomerata* L. (Elatinaceae)", as recorded by the collectors, F.W. and S.K. Gess.

GEOGRAPHIC DISTRIBUTION (Fig. 414).— Southwestern South Africa to central Namibia.

RECORDS.— NAMIBIA: Karibib District: 65 km SW Usakos (1 ♂, MS). **Lüderitz District**: Aus (5 ♀, 4 ♂, BMNH; 2 ♀, 4 ♂, CU). **Windhoek District**: Claratal 40 km SSW Windhoek (1 ♂, NMN). **SOUTH AFRICA: Eastern Cape Province**: 17 mi S Adelaide on road to Grahamstown (2 ♀, AMG), Bedford to Somerset East (1 ♂), Clifton Farm 18 km NW Grahamstown (2 ♀, 5 ♂; 7 ♀, 21 ♂, AMG), Grahamstown (1 ♂, PMA), 17 mi NW Grahamstown (1 ♀, AMNH), Hilton Farm 18 km WNW Grahamstown (3 ♀, 1 ♂; 4 ♀, 3 ♂, AMG), Kenton-on-Sea (16 ♀, AMG), Loerie (1 ♀, SAM), Resolution 17 air km NNE Grahamstown (1 ♀, TMP, holotype of *waltoni*), Rietbron (2 ♀, 1 ♂, AMG), Strowan Farm 5 air km W Grahamstown (2 ♀; 4 ♀,

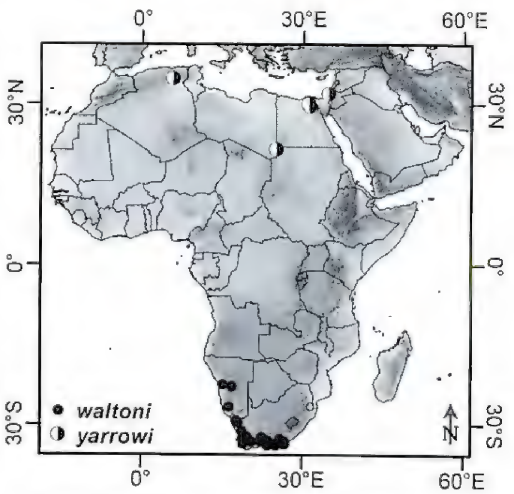


FIGURE 414. Collecting localities of *Tachysphex waltoni* and *yarrowi*.

AMG), Willowmore (2 ♂, AMG; 1 ♀, TMP), 43 km NE Willowmore at 32°59′S 23°34′E (1 ♀, 2 ♂), 12 km W Willowmore at 33°16′S 23°22′E (3 ♂), Wolwekraal Farm 33 km S Steytlerville (1 ♂; 1 ♀, 3 ♂, USU). **Northern Cape Province**: Middelpos (2 ♂, FSCA), SW Springbok (1 ♂, OÖLM), Steinkopf (1 ♀, FSCA), 10 km W Steinkopf (1 ♀, FSCA), Tanqua-Karoo National Park (1 ♂, SAM). **Western Cape Province**: Beaufort West District (2 ♂, SAM), 20 km N Citrusdal (1 ♂, OÖLM), Groot Rivier in Knysna District (1 ♀, AMG), Knersvlakte (1 ♂), Matjiesfontein (4 ♀; 5 ♀, 4 ♂, BMNH), Tierberg Farm 23 km NE Prince Albert (2 ♀, 1 ♂), Wellington: Rooshoek (1 ♀, RMNH).

Tachysphex yarrowi de Beaumont

Figures 414, 415.

Tachysphex No. 17: de Beaumont, 1940:178 (Egypt), corrected to *Tachysphex yarrowi* by de Beaumont, 1960b:239.

Tachysphex yarrowi de Beaumont, 1960b:239, ♀. Holotype: ♀, Libya: Cyrenaica: Ridotta Capuzzo, now Masai'd (BMNH), examined in 1974.— Pulawski, 1964:96 (Egypt, description of ♂), 1971:193 (in revision of Palearctic *Tachysphex*); de Beaumont, Bytinski-Salz, and Pulawski, 1973:9 (Israel); Bohart and Menke, 1976:277 (listed).

Recognition.— *Tachysphex yarrowi*, a North African species, has a flat labrum (not protruding beyond the clypeal free margin), hindwing crossvein cu-a vertical, and simple tarsi (midtarsomere II more than twice as long as apically wide, apical tarsomeres without spines on venter or lateral margins). It is further characterized by the well-defined mesopleural punctures with shiny interspaces, setae erect on the postocellar area, suberect on midfemoral venter, and inclined anterad on the propodeal dorsum. Also, the wing veins are all pale yellow, the lateral section of the female clypeus has the free margin straight, not concave (Fig. 415a), and the outer apical spine of male foretarsomere II is longer than foretarsomere III. This character combination is shared with *anubis*.

Unlike *anubis*, the scutal hindcorner of *yarrowi* is slightly prominent, punctures near the center of the mesopleuron are more than one diameter apart, the metapleural setae are as dense as those on the mesopleuron, the postocellar area in the female is concave and the midtrochanteral venter has only a few, sparse punctures, and the male clypeal lip is evenly arcuate and with an obtuse lateral corner (Fig. 415b). In *anubis*, the scutal hindcorner is not prominent (the usual shape), punctures near the center of the mesopleuron are less than one diameter apart, the metapleural setae are denser than those on the mesopleuron, the postocellar area is flat in the female and the midtrochanteral venter densely punctate, and the male clypeal lip is obtusely pointed and without lateral corner (Fig. 26b).

Description.— Free margin of clypeal lateral section unusually shallow (Figs. 415a, b). Scutal hindcorner roundly prominent. Scutal and mesopleural punctures well defined, up to several diameters apart on scutal disk, up to two or three diameters apart near center of mesopleuron; interspaces shiny. Punctures of mesothoracic venter several to many diameters apart except along midline. Propodeal dorsum finely rugose, in many specimens also longitudinally ridged; side ridged in most specimens, unridged in some males. Hindcoxal dorsum with inner margin carinate basally.

Setae erect on postocellar area, about as long as midocellar diameter; nearly erect on each side of oral fossa next to occipital carina, longer than midocellar diameter in female, shorter in male; subappressed to suberect on scutum; inclined anterad on propodeal dorsum, suberect on midfemoral venter (longest midfemoral setae equal to midocellar diameter). Mesopleural setae of female largely concealing integument; sternal setae of male not particularly dense, part of apical depressions asetose.

Head and thorax black, mandible yellowish red mesally. Frontal setae silvery in both sexes.

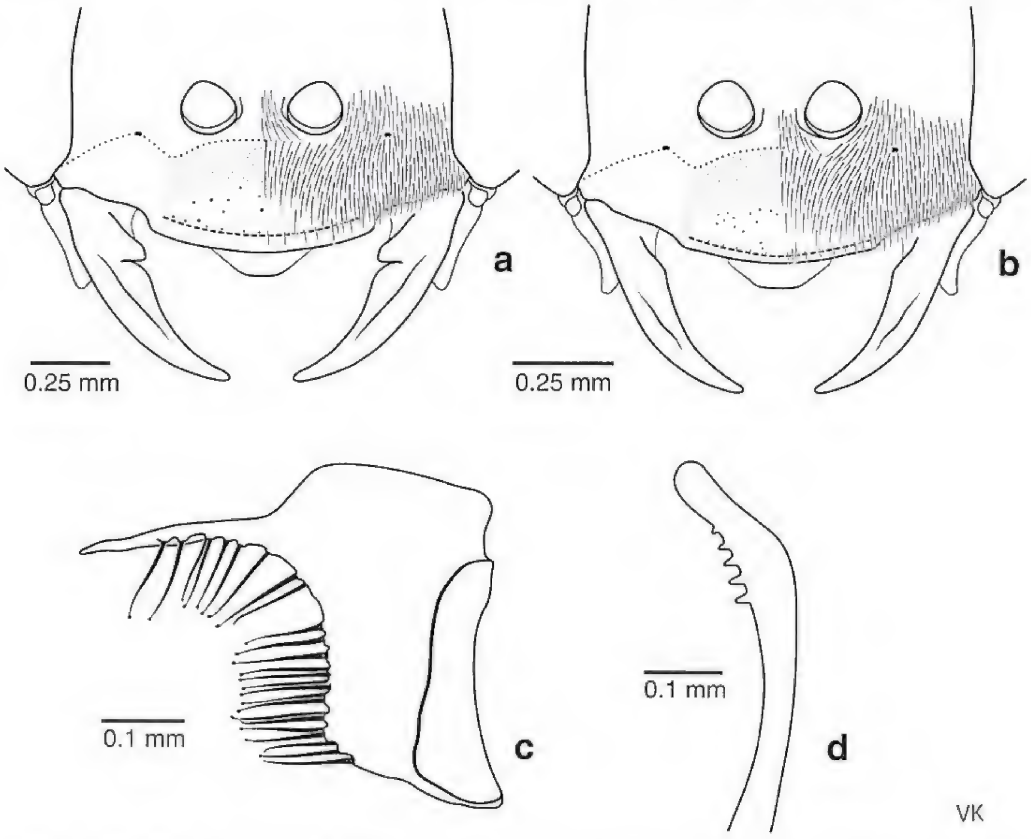


FIGURE 415. *Tachysphex yarrowi* de Beaumont: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Wing membrane nearly hyaline; costal and subcostal veins of forewing pale yellow. Femora black in most specimens, but mid- and hindfemora largely red in a female from Biskra, Algeria (de Beaumont, 1960b). Tibiae in female black, partly reddish (hindtibia largely reddish in some specimens), in male black, in most specimens reddish basally and apically; tarsi brown to reddish. Gaster varying from all red to all black in female, in male mostly black except tergum I reddish laterally in some specimens; apical depressions of terga translucent. Terga I–V silvery fasciate apically.

♀.— Clypeus (Fig. 415a): bevel about as long as basomedian area; lip free margin arcuate, not emarginate mesally not incised laterally. Postocellar area shallowly concave, 2.1 × as wide as long. Dorsal length of flagellomere I 2.4 × apical width. Dorsal foretibial surface with one spine; outer surface with two spines. Forebasitarsus with five rake spines. Midtrochanteral venter shiny, with a few, sparse punctures. Apical depression of tergum V with a few, sparse setae. Pygidial plate with punctures that average many diameters apart; interspaces aciculate. Length 6.0–8.0 mm.

♂.— Mandible: trimmal carina angulate subbasally, without real tooth or cleft. Clypeus (Fig. 415b): bevel about as long as basomedian area; lip free margin broadly arcuate, with obtuse but well-defined corner; distance between corners 1.8–1.9 × distance between corner and orbit. Width of postocellar area 2.6–2.9 × length. Dorsal length of flagellomere I 1.0–1.3 × apical width, its ventral length equal to 0.8–1.0 apical width. Forefemoral notch glabrous. Outer margin of forebasitar-

sus with four or five rake spines; outer apical spine of foretarsomere II longer than tarsomere III. Apical margin of sternum VIII with minute tooth mesally. Length 3.5–6.5 mm. Volsella and penis valve: Figs. 415c, d.

GEOGRAPHIC DISTRIBUTION (Fig. 414).— North Africa and Israel.

RECORDS.— **ALGERIA**: Biskra (de Beaumont, 1960b). **EGYPT**: **Al Jizah** (= Ghiza): Abu Rawash (1 ♀, 4 ♂; 1 ♂, MSNT), Manshiet Radwan (8 ♂), Wadi um Assaad near Abu Rawash (Pulawski, 1971). **Location unknown**: Ben Yusef (de Beaumont, 1960b). **ISRAEL**: Bat Yam (Pulawski, 1971). **LIBYA**: Masai'd at 21°33′N 25°01′E (de Beaumont, 1960b, as Ridotta Capuzzo).

Tachysphex zambius Pulawski, sp. nov.

Figures 416, 417.

DERIVATION OF NAME.— *Zambius*, a Neolatin masculine adjective derived from Zambia, where most specimens were collected.

RECOGNITION.— The unknown female of *zambius* is probably characterized by the following features, found in the male and unlikely to be sexually dimorphic: labrum flat, scutal and mesopleural punctures well defined (interspaces shiny), propodeal side ridged, hindwing vein cu-a vertical, setae erect on the postocellar area, about as long as midocellar diameter, and gaster all black, with silvery fasciate basal terga. This combination, however, does not suffice to distinguish *zambius* from similar species.

A unique feature of the male *zambius* is the presence of dense, long setae on sternum VII that extend beyond the sternum's hindmargin as a conspicuous fringe (Fig. 416b). Almost unique is a combination of a flat labrum and nonemarginate forefemur. Both features are found in exceptional *brevipennis*, which lacks the episternal sulcus, and in some *scopa*, in which the gaster is red and whose sterna are covered with unusually dense, conspicuous setae. In *zambius*, the episternal sulcus is present, the gaster is black, and sternal setae (except for sternum VII) are inconspicuous.

DESCRIPTION (male only).— Galea longer than wide in profile, about as long as 0.7 of scape. Scutal and mesopleural punctures well defined, interspaces shiny; most scutal punctures about one diameter apart, but some about 2–3 diameters apart; mesopleural punctures, at center, varying from about one to several diameters apart. Propodeal dorsum irregularly ridged to irregularly rugose; side ridged. Hindcoxal dorsum with inner margin carinate. Sternum I with obtuse, longitudinal carina in one specimen.

Setae suberect on each side of oral fossa next to occipital carina, shorter than midocellar diameter; erect on postocellar area and inclined posterad on scutum, about as long as midocellar diameter; oriented posterad on propodeal dorsum.

Head and thorax black, mandible reddish except black basally and apically. Frontal setae golden in male. Wing membrane slightly infumate; costal vein of forewing light brown, subcostal vein brown. Femora black, tibiae and tarsi red. Gaster black. Terga I–IV silvery fasciate apically.

♀.— Unknown.

♂.— Mandible: trimmal carina with tooth, without cleft. Clypeus (Fig. 416a): bevel ill defined, about as long as basomedian area; lip free margin obtusely pointed, with well-defined corner; distance between corners about 1.2 × distance between corner and adjacent orbit. Width of postocellar area 0.9–1.1 × length. Dorsal length of flagellomere I 1.8 × apical width. Forefemur not emarginate. Outer margin of forebasitarsus without preapical spines; outer apical spine of foretarsomere II markedly shorter than tarsomere III. Venter of tarsomeres V with one small, preapical spine. Tergum VI, in one specimen, with punctures that are more than one diameter apart. Sterna III–VI with well-defined punctures that average several diameters apart. Sternum VII (except laterally) with dense, long setae that extend beyond the sternum's hindmargin as conspicuous fringe (Fig.

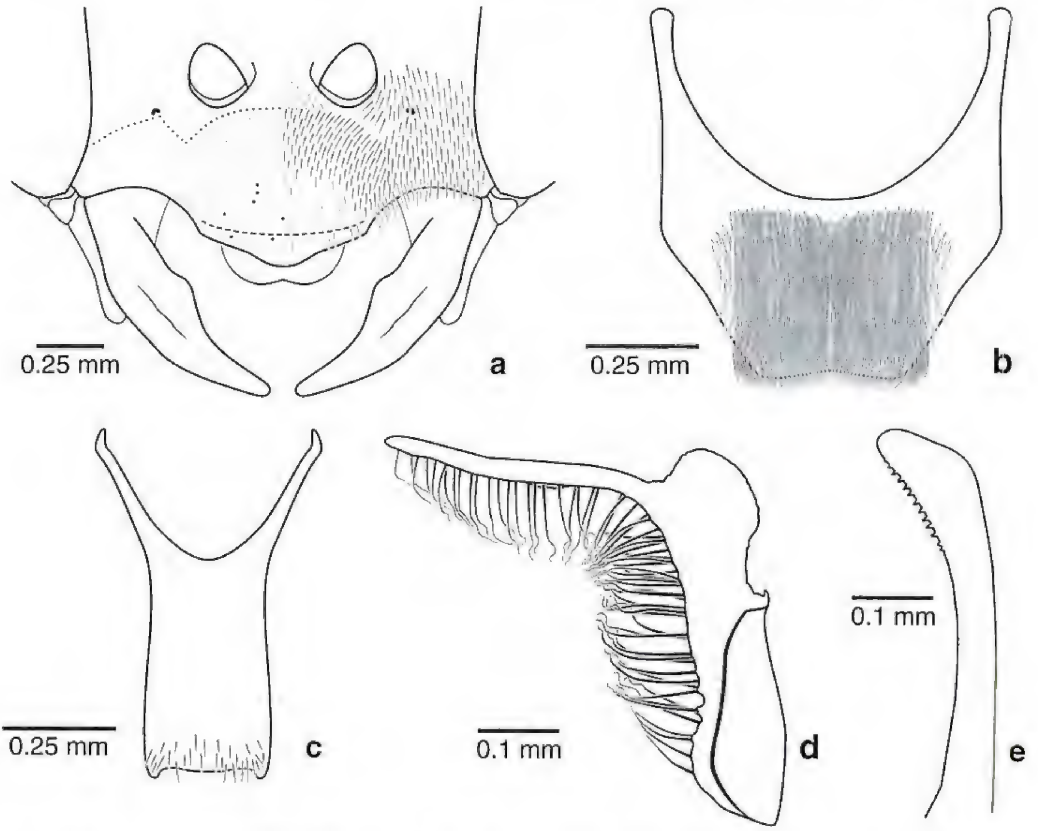


FIGURE 416. *Tachysphex zambius* Pulawski, sp. nov., male: a – clypeus and mandible; b – sternum VII; c – sternum VIII; d – volsella; e – penis valve.

416b) Sternum VIII broadly, shallowly emarginate apically (Fig. 416c). Length 6.0–6.5 mm. Volsella and penis valve: Figs. 416d, e.

GEOGRAPHIC DISTRIBUTION (Fig. 417).— Zambia.

RECORDS.— HOLOTYPE: ♂, **ZAMBIA: Southern Province:** 56 road km NE Choma at 16°37′S 27°20′E, 12 Mar 1995, WJP (CAS). PARATYPES: **MALAWI**: Mombera Bay, 15–19 June 1910, S.A. Neave (1 ♂, BMNH). **ZAMBIA: Eastern Province:** 32 km E Petauke at 14°17′S 31°37′E, 24–26 Mar 1995, WJP (2 ♂).

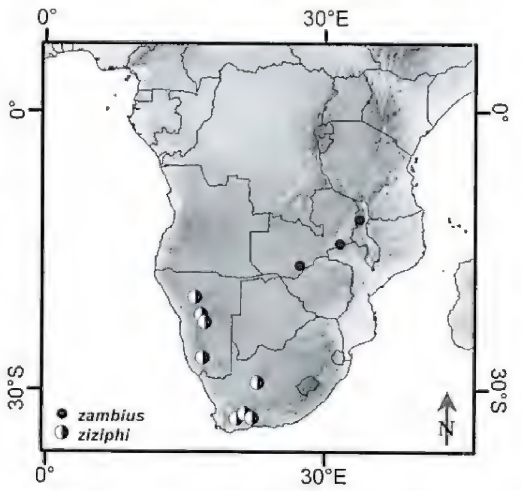


FIGURE 417. Collecting localities of *Tachysphex zambius* and *ziziphi*.

***Tachysphex ziziphi* Pulawski, sp. nov.**
Figures 417, 418.

Derivation of name.— Named after *Ziziphus mucronata* Willdenow (Rhamnaceae) to whose flowers this wasp is attracted.

Recognition.— *Tachysphex ziziphi* has an apically convex labrum, elongate galea (length equal to 0.8 of scape), and the propodeal dorsum glabrous apicomesally (Fig. 418c). The female can be recognized from similar species by a somewhat prominent corner of the clypeal lip (Fig. 418a). In the male, an obtusely pointed clypeal lobe and an edentate inner mandibular margin are distinctive (Fig. 418b) in combination with a red gaster (apex black in some specimens) and a short foretarsal rake (the apical spine of tarsomere II is at least slightly shorter than tarsomere III).

Description.— Labrum convex (but less so than in *panzeri* or *pentheri*) and protruding from beneath clypeus, its free margin only slightly arcuate mesally. Galea slightly longer than wide in profile, as long as 0.8 of scape. Scutal punctures fine, averaging about 1–2 diameters on disk. Mesopleuron microsculptured, dull, with minute, evanescent punctures. Propodeal dorsum evenly microareolate; side finely ridged in female (not ridged posteroventrally), evenly microsculptured in most males but with evanescent ridges in some. Hindcoxal dorsum with inner margin not carinate.

Setae appressed on postocellar area and scutum; nearly appressed, shorter than midocellar diameter on each side of oral fossa next to occipital carina; on propodeal dorsum converging obliquely posterad toward midline, but glabrous apicomesally on at least half length (Fig. 418c).

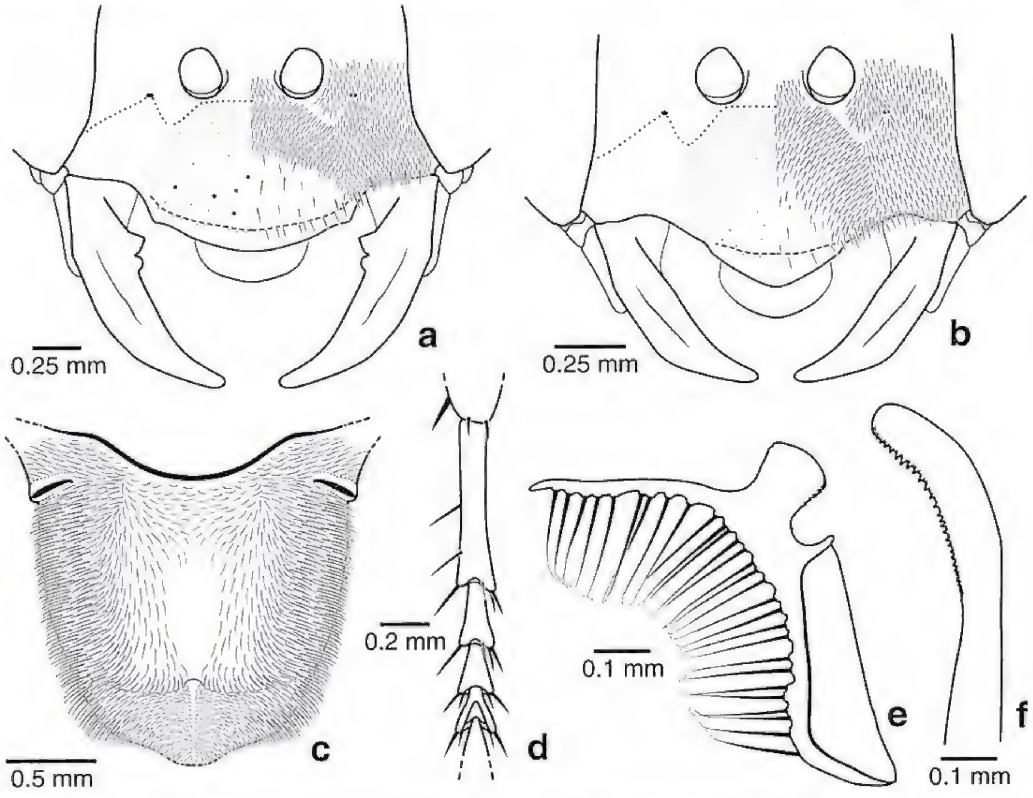


Figure 418. *Tachysphex ziziphi* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – propodeal dorsum showing setal pattern; d – male foretarsomeres I–IV; e – volsella f – penis valve.

Head and thorax black, mandible red (except black apex); also clypeal bevel and labrum red in female and most males. Frontal setae silvery in female, golden in male (clypeal vestiture silvery in many specimens). Wings almost hyaline; costal vein of forewing light brown, subcostal vein brown. Femora, tibiae, and tarsi red, or fore- and midfemora largely black dorsally. Gaster all red or male segments IV–VII black. Terga I–III silvery fasciate apically.

♀.— Clypeus (Fig. 418a): bevel slightly longer than basomedian area; lip free margin arcuate, not incised laterally, corner slightly prominent. Width of postocellar area 0.8 × length. Dorsal length of flagellomere I 2.7 × apical width. Dorsal foretibial surface with two spines; outer surface with two spines, sparsely micropunctate in distal half. Forebasitarsus with eight rake spines. Apical depression of tergum V punctate and setose. Pygidial plate with punctures that average several diameters apart, interspaces aciculate. Length 10.8 mm.

♂.— Mandible: trimmal carina nearly evenly curved, without tooth or cleft (Fig. 418b). Clypeus (Fig. 418b): bevel slightly longer than basomedian area; lip free margin obtusely pointed, without corner (forming single curved line with rest of clypeal margin). Width of postocellar area 0.8–1.0 × length. Dorsal length of flagellomere I 1.2–1.8 × apical width. Forefemoral notch microscopically setose. Outer margin of forebasitarsus with three rake spines in most specimens (Fig. 418d), with two spines on one leg and no preapical spines on other in smallest male; outer apical spine of foretarsomere II at least slightly shorter than tarsomere III (markedly shorter in smallest specimens). Length 6.2–8.7 mm. Volsella and penis valve: Figs. 418e, f.

Habitat.— The specimens from Waldau River, Namibia, were collected around blooming trees of *Ziziphus mucronata* Willdenow (Rhamnaceae) along the shores of the then dry riverbed. They were flying low above the ground and landing periodically.

Geographic distribution (Fig. 417).— Namibia, western South Africa.

Records.— Holotype: ♂, **NAMIBIA**: **Okahandja District**: Waldau River 17 km W Okahandja at 21°57′S 16°45′E, 14 Dec 1996, WJP (CAS). Paratypes: **NAMIBIA**: **Bethanien District**: Riverside 135 [Farm 15 km SW Bethanie], 23–26 Oct 1971, collector unknown (2 ♂, NMN). **Okahandja District**: same locality and collector as holotype, 3–4 Dec 1996 (3 ♂), 12 Dec 1996 (5 ♂), 14 Dec 1996 (1 ♀, 6 ♂). **Outjo District**: Namatubis Guest Farm 15 km NW Outjo, 27 Aug 1995, B. Gabriel (1 ♂, CSE). **Windhoek District**: 2 km S Aris, 5 Feb 1990, WJP (1 ♂). **SOUTH AFRICA**: **Northern Cape Province**: Niekerkshoop in Griqualand , 1939 [South African] Museum Staff (1 ♂, SAM). **Western Cape Province**: Matjiesfontein, 14–27 Nov 1928, R.E. Turner (1 ♂, BMNH); Merweville at 32°40′S 21°30′E, Jan 1959, H. Zinn (1 ♂, SAM); Tierberg Farm 23 km NE Prince Albert District, 26 Nov–5 Dec 1987, F.W., S.K., and R.W. Gess (1 ♂, AMG); same locality except 33°10′S 22°15′E, 21–22 Jan 1996, WJP (1 ♂).

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APPENDIX I
Additional Species

***Tachysphex merina* Pulawski, sp. nov.**
Figures 419, 420.

DERIVATION OF NAME.— *Merina*, a Malagasy tribe of the central part of the island, where the holotype was collected; a noun in apposition to the generic name.

RECOGNITION.— *Tachysphex merina* is an all black endemic of Madagascar. The female differs from the other Malagasy species in having the forefemoral venter, midtrochanteral venter, and midfemoral posteroventral face with large punctures that are several to many diameters apart; in addition, the setae are oriented posterad on the propodeal dorsum, tarsomeres IV are as long as wide, with the apicoventral margin concave, and the apical tarsomeres have one or a few small preapical spines on the venter. The unknown male probably has sparsely punctate forefemoral and/or midfemoral venter, like the female.

The female of *merina* resembles the southern African *ibi*, but unlike that species has a wider postocellar area (width 1.5 × length rather than 0.9–1.0), scutum unridged (rather than finely ridged adjacent to hindmargin), scutal punctures many diameters apart (rather than 2–3 diameter apart or less), mesopleural punctures beneath scrobe several diameters apart (rather than 2–3 diameters apart), and the foretibia all black (rather than with the red inner surface).

DESCRIPTION (based on holotype only).— Scutal punctures minute, many diameters apart except near margins; interspaces unsculptured, shiny. Mesopleural punctures several diameters apart beneath scrobe, interspaces alutaceous. Punctures of mesothoracic venter close to each other near midline, but many diameters apart around signum. Episternal sulcus complete. Propodeal dorsum coriaceous, also with irregular, longitudinal ridges in basal half or so; side ridged. Hindcoxal dorsum carinate basally.

Setae erect on postocellar area but no longer than midocellar diameter; suberect on each side of oral fossa next to occipital carina, about 1.5 × midocellar diameter long; nearly appressed on scutum; oriented posterad on propodeal dorsum.

Body black except mandible reddish mesally and tarsal apex dark brown. Frontal setae silvery in female. Wing membrane slightly infumate; costal vein of forewing dark brown, subcostal vein brown. Terga I and II apically with ill-defined silvery fasciae.

♀.— Labrum with rudimentary emargination. Clypeus (Fig. 419): bevel longer than basomedian area; lip free margin arcuate, not emarginate mesally, with two lateral incisions on each side. Width of postocellar area 1.5 × length. Dorsal length of flagellomere I 1.9 × apical width. Forefemoral venter with large punctures that are many diameters apart; interspaces shiny, practically unsculptured. Foretibial outer surface asetose except for three erect, conspicuous setae. Forebasitarsus with no fewer than 15 rake spines, middle spines shorter than either basal or apical ones. Midtrochanteral venter with a few, sparse punctures, interspaces unsculptured. Midfemoral

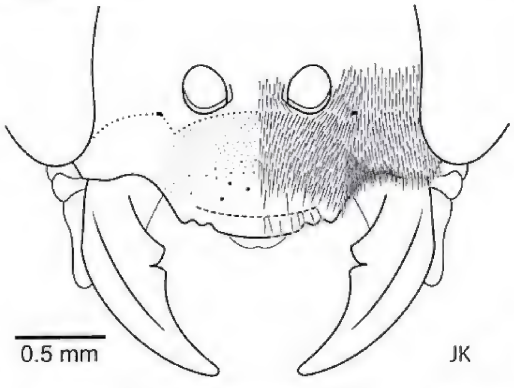

FIGURE 419. *Tachysphex merina* Pulawski, sp. nov.: female clypeus and mandible.

venter and posteroventral surface with large punctures that are several to many diameters apart; interspaces shiny, practically unsculptured. Hindtarsomere IV as long as wide. Apical tarsomeres each with one or a few preapical spines, apicoventral margin minimally arcuate. Tergum V with punctures that are many diameters apart, apical depression of tergum V unsculptured and asetose (except laterally). Pygidial plate with punctures that are several diameters apart mesally, interspaces unsculptured. Length 8.4 mm.

♂.— Unknown.

Geographic distribution (Fig. 420).— Madagascar.

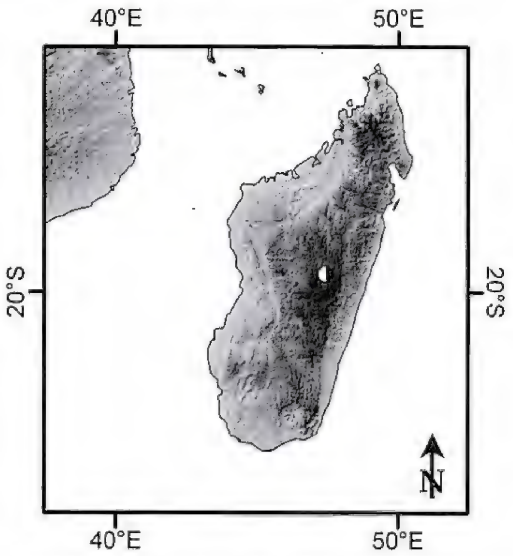

Figure 420. Collecting locality of *Tachysphex merina* Pulawski, sp. nov.

Records.— Holotype: ♀, **MADAGASCAR**: Ambatolampy, no date or collector, with additional label "Mus. Paris, 1931, Lasère" (MNHN). There are more than 40 localities named Ambatolampy in Madagascar, but most are small villages. Most probably the specimen was collected near the town of Ambatolampy in the Antananarivo Province, at 19°21′S 47°27′E on the main road to the south.

Tachysphex ampijoroa Pulawski, sp. nov.

Figures 90, 421.

Derivation of name.— *Ampijoroa*, a National Park in Madagascar where the type series was collected; a noun in apposition.

Recognition.— *Tachysphex ampijoroa* has the setae sinuous on the postocellar area and thorax, but appressed on tergum I. In addition, the hindwing vein cu-a is vertical, and the apical tarsomeres have no spines on the venter. *Tachysphex platystethus* is similar, but *ampijoroa* differs in having the propodeal dorsum uniformly, finely ridged transversally, rather than with conspicuous ridges that are diverging basally. Also, in the female of *ampijoroa* the thorax is not flattened (rather than conspicuously flattened), the clypeal lip has two lateral incisions on each side (no incisions in *platystethus*), the lateral carinae of the pygidial plate clearly diverge anterad (almost parallel in *platystethus*) and are present on most of tergal length (only apically in *platystethus*). The male is unique among the Malagasy *Tachysphex* in having a pointed clypeal lip, and the apically tridentate sternum VIII differentiates it from *platystethus*.

Description.— Female clypeus with obtuse carina that emerges from each lip corner. Scutal punctures well defined, about 2–3 diameters apart at center in most specimens, many diameters apart anterolaterally in single female. Mesopleural punctures well defined, several diameters apart at center. Punctures of mesothoracic venter several diameters apart. Episternal sulcus complete or nearly so. Propodeal dorsum finely, transversely ridged; side punctate. Hindcoxal dorsum with inner margin carinate, carina slightly expanded basally.

Setae sinuous, erect or suberect on lower gena, postocellar area, scutum, mesopleuron, propodeum, and midfemoral venter; setal length about 0.6 of basal mandibular width on each side of oral fossa next to occipital carina, about 0.4 on postocellar area, about 0.5 on scutum anterolaterally; oriented obliquely anterad on propodeal dorsum.

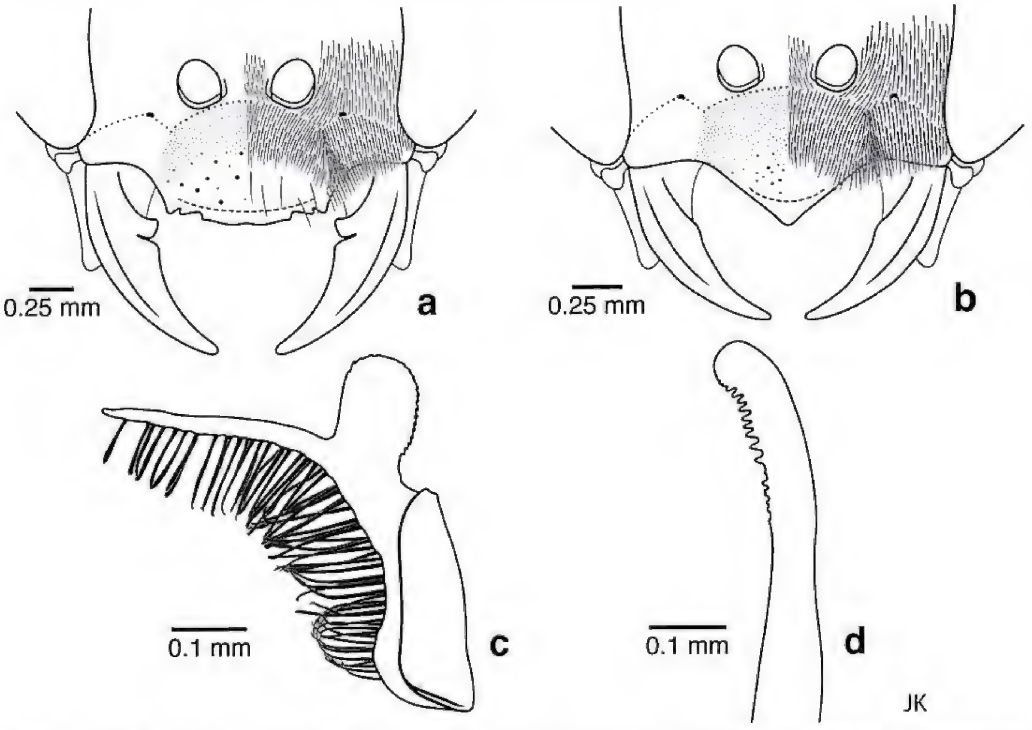

FIGURE 421. *Tachysphex ampijoroa* Pulawski, sp. nov.: a – female clypeus and mandible; b – male clypeus and mandible; c – volsella; d – penis valve.

Head and thorax black, mandible dark red at about two thirds of length. Frontal setae silvery in both sexes. Wing membrane practically hyaline; costal and subcostal veins of forewing black. Femora and tibiae black, apical tarsomeres reddish brown. Gaster black. Terga I–III (I–IV in some males) silvery fasciate apically.

♀.— Clypeus (Fig. 421a): bevel slightly longer than basomedian area; lip free margin arcuate, with two lateral incisions on each side. Width of postocellar area 1.3 × length. Dorsal length of flagellomere I 1.9 × apical width. Forefemoral venter with small, sparse punctures. Foretibial outer surface with three thick setae. Forebasitarsus with 14 rake spines. Midtrochanteral venter with punctures that are many diameters apart. Terga IV and V with a few, scattered punctures, their apical depression impunctate, glabrous. Pygidial plate with well-defined punctures that are several diameters apart; interspaces unsculptured. Length 12.0 mm.

♂.— Mandible: trimmal carina without tooth and cleft. Clypeus (Fig. 421b): bevel shorter than basomedian area; lip free margin pointed, without corner, forming single curve line with rest of clypeal margin. Width of postocellar area 1.1–1.2 × length. Dorsal length of flagellomere I 1.7–1.8 × apical width. Forefemoral notch: bottom microscopically setose. Outer margin of forebasitarsus with no preapical spines; outer apical spine of foretarsomere II shorter than tarsomere III. Sterna IV and V largely impunctate basally. Sternum VIII tridentate apically. Length 8.7–10.1 mm. Volsella and penis valve: Figs. 421c, d.

GEOGRAPHIC DISTRIUBUTION (Fig. 90).— Known from one locality in Madagascar.

RECORDS.— HOLOTYPE: ♂, **MADAGASCAR**: **Mahajanga**: Ampijoroa [=Ankarafantsika] National Park at 16°19.16′S 46°48.8′E, 7–14 Sept 2003, Rin'ha Harin'hala (CAS). PARATYPES: same data as holotype (1 ♀, 6 ♂).

Appendix II

The following data matrix was constructed using the Winclada program by Kevin Nixon, where non-applicable characters are indicated by a dash (-), and missing characters are represented by a question mark (?). Multiple character states are all treated as additive. The characters 33, 38, 51, 58, 69, and 77, which caused large sections of the trees collapse in the initial analyses, were deactivated.

Character number	0	1	2	3	4	5	6	7	8
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Holotachysphex mochii	000001-0101000000000001000001000101000C0000100000000000000100000011201001000000000
Holotachysphex turneri	0000000010100000000000100000100110100000000100000000000000100000011201001000000000
Kohliella anula	0000000000100000000000000010020000000200110000100000000000000000000-0000100100000
Parapiagetia genicularis	0000100000100010000000001000000001000C0120000000000000000000000000-0000000100000
aborigenus	0000000000100001000000002100000020000100110000000000000000100000021000010000010C
aburi	0110100000100000000000000000000000000200100000110001100000000000020010000000000
acanthophorus	0000000000100000000000000000000000000010010000011001211000000000020000000000000
actites	0000000000100000000000000000000000000121020000010000000000000000020000000000000
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acutus	0000000000100000000000000000000000000020020000000000000000000000020000000000000
adjunctus	0000100000100000000000000000000000000200100002210002000000000000020000000000000
aequalis	0100000000100000000000000000000010000120020000020000211000000000020000000000000
aethiopicus	2000100000100000000000001000000000000020001100000000000000000000000020000001200000
aethiops	0000000000100000000000000000000000000020110000000000000000000000020000000000000
agilis	0100000000100000000000000000000000000221020010022111210100000000020001000000000
alayoi	0100000000100000000000000000000000000011200100221112001000000000020000000000000
albocinctus	0000000000100000000000002200001000000100110000000000000-2100000200000100000100
anceps	0100000000100000000000000000000000000200200000000010000000000002000000000000000
anthracinus	0100000000100000000000000000000000000220020000110001110000000001020000000000000
antillarum	0000000000100002000000000010000000000002000000000000000000000000000000000000000
apicalis	0000000000100002000111000001000000000000010000000000000000000000020000000000000
apoctenus	1000100000100002000000000000000000000000020000000000000000000000020000000000000
argenticops	0001000000100000000000002000000010000000100000000010000100111000021010010111001
argentifrons	0100000000100000000000000000000000000221020010022111210100000000020010000000000
armatus	0000000000100000000000000000000000000011000012100121100000000000020000000000000
ashmeadii	1000000000100000000000000000000000000001001000000000000000000000020000000000000
asinus	0000100000200000000000000000000010011020010000220001000000200000002101000000001100
auropilosus	0010100000100000000000000000000002000000100000010012100000000000020011000000000
bara	0000000000100000000000000000000000000002001000000100121000000000020010000000000
barkeri	0000100000100000000000000000000000000200200012100011100000000000020010000000000
beaumonti	0000000000100000000000000000000000000010000200000000000020000010200000000000000
belfragei	0100000000100000000000000000000001000022002000012100020100000000020000000000000
bengalensis	0100000000100000000000000000000000003210200100221112101000000000200100100000000
bipustulosus	0100000001110000000000000000000000002002000021000000000100000002000000000000000
brachypus	0000100000100000000000000000000000000200200012200011100000000000020010000001000
brasilianus	0000000000100001000000002200001000000000110000000000000-2100000200000100000100
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brevipennis	0000000100100000001000000000000000000000001000000000000000000000020000000000000
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bruneiceps	0000000000100000000000002200001000000000110000000000000-2100000200000100001100
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carli	0000000100100000001000000000000000000200100000000000000000000020000000000000
changi	0100000000100000000000000010000000002210200100221112101000000000200100000000000
circulans	0100100000100000000000000000000000000012001001002000021010000000020000000000000
clarconis	0000000000100002000000000000000000000000200000000000000000000020000000000000
cocopa	0000000000100000000000000000000000000010000101001211000100000002000000000000000
conceptus	1000100000100000000000000000000000000002000000000000000000000020000000000000000
consocius	0000000000100000000000000000000000000200100000000000000000010002000000000000000
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cubanus	0000000001000000000000000000000000000010010000000000000000000010020000000000000
curvipes	0001000002000000000000002000000000000000010000000001000110001100021000010011100
denisi	0100000100010000000000001000000000000221120000122111210100000001002000000000000
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desertorum	0001000000100000000000002000000021000000100000000010000000111000021000010011100

Character number	0	1	2	3	4	5	6	7	8
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diadelus	2	0	0	1	0	0	0	0	0
dignus	0	0	0	0	0	0	0	0	0
diversilabris	0	0	0	0	0	0	0	0	0
dominicanus	0	0	0	0	0	0	0	0	0
erythropus	0	1	0	0	0	0	0	0	0
eucharistus	0	1	0	0	0	0	0	0	0
eurystoma	0	0	0	0	0	0	0	0	0
euxinus	0	0	0	0	0	0	0	0	0
excisus	2	0	0	1	0	0	0	0	0
fanuiensis	0	1	0	0	0	0	0	0	0
flavofimbriatus	0	1	0	0	0	0	0	0	0
foliaceus	0	1	0	0	0	0	0	0	0
fortior	0	1	0	0	0	0	0	0	0
frigidus	2	0	0	1	0	0	0	0	0
fugax	0	0	0	0	0	0	0	0	0
fulgidus	2	0	0	1	0	0	0	0	0
fulvitarsis	0	1	0	0	0	0	0	0	0
gagates	0	1	0	0	0	0	0	0	0
galapagensis	0	0	0	0	0	0	0	0	0
galeatus	0	1	0	0	0	0	0	0	0
gastrotrichus	2	0	0	1	0	0	0	0	0
geniculatus	2	0	0	1	0	0	0	0	0
gessianus	0	0	0	1	0	0	0	0	0
glabrior	0	0	0	0	0	0	0	0	0
graecus	0	1	0	0	0	0	0	0	0
grandissimus	0	1	0	0	0	0	0	0	0
gryllivorus	0	0	0	0	0	0	0	0	0
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gussakovskii	0	0	0	0	0	0	0	0	0
hadronyx	2	0	1	0	0	0	0	0	0
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hurdi	0	0	0	0	0	0	0	0	0
ibi	0	0	0	0	0	0	0	0	0
incertus	2	0	0	1	0	0	0	0	0
inconspicuus	0	1	0	0	0	0	0	0	0
indicus	0	0	0	0	0	0	0	0	0
insulsus	0	1	0	0	0	0	0	0	0
iridipennis	0	1	0	0	0	0	0	0	0
isis	0	1	0	0	0	0	0	0	0
jujuyensis	0	1	0	0	0	0	0	0	0
julliani	0	0	0	1	0	0	0	0	0
kalaharicus	0	0	0	0	0	0	0	0	0
karoo	0	0	0	0	0	0	0	0	0
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longipes	0	0	0	0	0	0	0	0	0
luctuosus	0	0	0	1	0	0	0	0	0
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marshalli	0	0	0	1	0	0	0	0	0
mashona	0	1	0	0	0	0	0	0	0
mauretanus	0	0	0	1	0	0	0	0	0
maurus	0	1	0	0	0	0	0	0	0
maximus	0	1	0	0	0	0	0	0	0
maya	0	1	0	0	0	0	0	0	0
mediterraneus	0	0	0	0	0	0	0	0	0
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melas	0	0	0	1	0	0	0	0	0
menkei	0	1	0	0	0	0	0	0	0
mesembrius	0	0	0	0	0	0	0	0	0
micans	2	0	0	2	0	0	0	0	0
mkomazi	0	0	0	1	0	0	0	0	0
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modestus	0	0	0	0	0	0	0	0	0
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multifasciatus	0	1	0	0	0	0	0	0	0

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mzingeli	0	0	1	0	0	0	0	0	0
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nasalis	0	0	0	0	0	0	0	0	0
nigerrimus	0	1	0	0	0	0	0	0	0
nigrior	0	0	0	0	0	0	0	0	0
nitidus	0	0	0	0	0	0	0	0	0
noar	2	0	0	1	0	0	0	0	0
notogoniaeformis	2	0	0	1	0	0	0	0	0
novarae	0	1	0	0	0	0	0	0	0
oberon	0	0	0	0	0	0	0	0	0
obscuripennis	0	1	0	0	0	0	0	0	0
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omoi	0	0	0	0	0	0	0	0	0
onager	0	0	0	1	0	0	0	0	0
orestes	0	0	0	0	0	0	0	0	0
osiris	0	1	0	0	0	0	0	0	0
ovambo	0	1	0	0	0	0	0	0	0
oxychelus	0	1	0	0	0	0	0	0	0
pacificus	1	0	0	0	0	0	0	0	0
paiute	0	0	0	0	0	0	0	0	0
palopterus	2	0	0	0	0	0	0	0	0
panzeri	2	0	0	0	0	0	0	0	0
papago	0	0	0	0	0	0	0	0	0
paulus	0	1	0	0	0	0	0	0	0
pechumani	0	0	0	0	0	0	0	0	0
pectinatus	0	0	0	0	0	0	0	0	0
pentheri	2	0	0	1	0	0	0	0	0
perniger	0	1	0	0	0	0	0	0	0
persistans	1	1	0	0	0	0	0	0	0
pilosulus	0	0	0	0	0	0	0	0	0
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subfimbriatus	0	0	0	0	0	0	0	0	0
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tenuicornis	2	0	0	1	0	1	0	0	0
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xanthoptesismus	0	1	0	0	0	0	0	0	0
ziziphi	1	0	0	0	0	0	0	0	0

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areas: one includes Namibia, Botswana, and western South Africa, another Ethiopia, Kenya, and Tanzania, and the third Burkina Faso, Mali, Mauritania, and Senegal. The gap between southern Africa and Kenya is not likely to be a collecting artifact, as some of the intermediate areas (e.g., Zimbabwe) have been thoroughly collected, with no *calidus* ever found there.

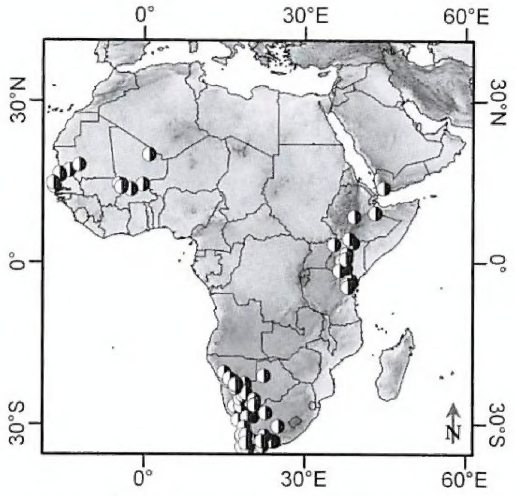

FIGURE 79. Collecting localities of *Tachysphex calidus*.

RECORDS.— HOLOTYPE: ♂, **NAMIBIA**: **Karibib District**: Khan River 23 km N Karibib at 21°47′S 15°57′E, 20–21 Feb 1996, WJP (CAS). PARATYPES: **BOTSWANA**: Kuke Pan, 14–15 Apr 1972, [British Museum] Southern African Expedition (1 ♂, BMNH). **BURKINA FASO**: 1 km NE Gorom Gorom at 14°27.3′N 0°13.1′W, 29 July 2004, Sidiki Konaté and WJP (2 ♀); 4 km NW Ouahigouya at 13°37.0′N 2°27.6′W, 6–7 Aug 2004, Sidiki Konate and WJP (1 ♂). **ETHIOPIA** (all collected by Veronica Ahrens, Emiru Seyoum, and WJP in 1997): **Harerge**: 43 km SE Jijiga, 27 Aug (2 ♂). **Shoa**: 8 km W Nazret, 8 Aug 1997 (1 ♂). **Sidamo**: 13 km N Moyale, 10 Aug (1 ♀, 1 ♂); 26 km N Moyale, 12 Aug (1 ♀, 2 ♂); 63 km S Yabelo, 16 Aug (1 ♀, 20 ♂). **KENYA**: **Coast Province**: Kitani Lodge in Tsavo West National Park, 29 Dec 1969, M.E. Irwin and E.S. Ross (1 ♂); 11 mi S Maktau, 2 Nov 1957, E.S. Ross and R.E. Leech (1 ♂); Taita Discovery Centre, 30 Sept 2001, E. Selempo (1 ♂), 13–14 Dec 2002, M.A. Prentice (2 ♀) and WJP (1 ♂); Taita Discovery Centre: Galla Hill area, 2 June 2000, M.H. Bourbin, V.F. Lee, and WJP (2 ♂); Tsavo National Park, Aug 1977, D. Quicke (1 ♀, BMNH); Voi, Milan Halada, 8–18 Nov 1996 (3 ♀, 26 ♂, OÖLM), 22 Nov–2 Dec 1996 (7 ♂, OÖLM); 2 km S Voi, 16 Dec 2002, M.A. Prentice (1 ♀); Voi area, 23 Mar–4 Apr 1997, Marek Halada (2 ♀, 8 ♂, OÖLM). **Eastern Province**: near Ewaso Ng'iro River opposite Archer's Post, M.A. Prentice, 2–8 Dec 2002 (1 ♀, 2 ♂) and 19–20 2002 (1 ♀, 3 ♂); same locality, WJP, 2–8 Dec 2002 (1 ♂) and 19–20 Dec 2002 (1 ♀, 1 ♂); 5 km NNE Isiolo, 8–10 June 2000, M.H. Bourbin, V.F. Lee, and WJP (2 ♀, 3 ♂), WJP, 1 Dec 2002 (1 ♂), 18 Dec 2002 (1 ♀); Laisamis, 11 Dec 1969, M.E. Irwin and E.S. Ross (1 ♀); 94 km E Thika, 5 July 1999, WJP and J.S. Schweikert (1 ♀, 5 ♂). **Rift Valley Province**: Archer's Post at Ewaso Ng'iro River, M.E. Irwin and E.S. Ross, 6 Dec (2 ♀) and 12 Dec 1969 (1 ♀); 33 km N Lodwar, 23 Nov 2002, M.A. Prentice (1 ♀); Magadi road 46 air km SW Nairobi, WJP and J.S. Schweikert, 17 June (12 ♂), 22 June (6 ♀, 6 ♂), 29 June (3 ♀, 8 ♂) and 30 June 1999 (3 ♂), 2 July (3 ♂), 18 July (5 ♂), and 20 July 1999 (10 ♂); same locality but 4 May 2000, V.F. Lee and WJP (2 ♂); same locality, 29 Nov 2002, WJP (1 ♀, 1 ♂); same locality, 29 Nov 2002, M.A. Prentice (2 ♂); near Mpala Research Centre at 0.30°N 36.91°E, R.R. Snelling, 26 and 27 Jan 2000 (2 ♂, LACM), 9 Feb 2000 (1 ♂, LACM), 10 Feb 2000 (2 ♂, LACM); Olorgesailie, WJP and J.S. Schweikert, 1 June (6 ♂), 3 and 19 July 1999 (2 ♂); Samburu [National Park]: Buffalo Springs, 15–18 July 1987, H.R. Feijen (1 ♂, ZMAN). **MALI**: 10 km S Mopti, WJP, 7 Aug 1991 (1 ♂) and 20 Aug 1991 (1 ♀); 45 km W Mopti, 9 Aug 1991, WJP (1 ♀); 100 km NE San, 21 Aug 1991, WJP (1 ♂), Tilemsi at 20°N, 20 Oct–2 Nov 1981, G. Popov (1 ♀, KMG). **MAURITANIA**: Lake Aleg 30 km W Aleg, 28 Oct 1993, WJP (2 ♀); Tamouret Naaj ca 30 air km NE Moudjéria, 30 Oct 1993, WJP (1 ♀). **NAMIBIA**: **Bethanien District**: Riverside 135 [Farm], 23–16 [*sic*] Oct 1971, collector unknown (1 ♂, NMN). **Gobabis District**: 10–40 km W Gobabis, 3 Mar 1977, J.G. Rozen (1 ♀, AMNH). **Karasburg District**: Groenrivier 265 [Farm], SE 2718 Bd [= between 27°15′ and 27°30′S and 18°45′ and 19°00′E], 25 Apr 1972, collector unknown (1 ♂, NMN); Karasburg, 30 Dec 1977, H. Empey (1 ♀, 2 ♂, AMG). **Karibib District**: Karibib, 7 Feb 1993, MS (1 ♂, MS); 15 km E Karibib, 13 Jan 1993, J. Gusenleitner (3 ♂, MS) and MS (4 ♂, MS); 15 km W Karibib, 5 Apr 1998, FSG (1 ♂, AMG); Khan River 23 km N Karibib, 20–21 Feb 1996, WJP (2 ♀, 6 ♂). **Keetmanshoop District**: Keetmanshoop, 20 Dec 1977, H. Empey (2 ♀, 1 ♂, AMG); Welverdiend Farm No. 328 1 km W Mata Mata at 25°47′S 19°59′E, 15 and 16 Oct 1972, C.L. Hogue (2 ♀, LACM). **Khorixas District**: 4 km E Khorixas,